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and AIR RESERVE GAZETTE

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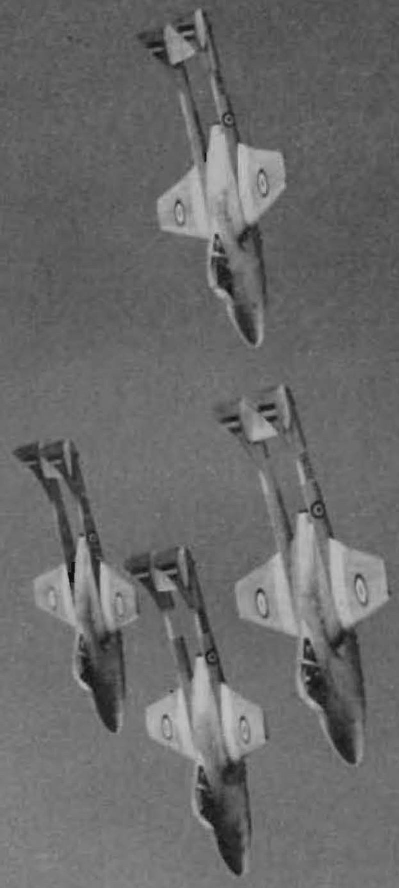

The advanced flying and weapons training aircraft of the Royal Air Force, the Royal Navy and of more than a score of national air forces throughout the world

DE HAVILLAND VAMPIRE TRAINER

(de Havilland Goblin jet engine)

Editor:
FRANK HILLIER

AIR Pictorial
and AIR RESERVE GAZETTE

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A.T.C. Reforms

SINCE the presentation of the Report of the Taylor Committee, which was entrusted with the task of advising on the organisation and administration of the Air Training Corps, its recommendations have been under careful consideration by the Air Ministry, and decisions have now been reached in regard to all of them. The Report was a business-like document, and there is no doubt that the adoption of its recommendations will result in very substantial economy.

Certain of its recommendations did, however, arouse considerable misgivings in many quarters where it was feared that a decision to remove the control and administration of the Corps from Home Command would result in a weakening of the essential ties between the A.T.C. and the Royal Air Force, even though the Committee stressed the necessity for reinforcing them. In principle at least, the new arrangements should relieve the fears which have been expressed. The Air Officer Commanding-in-Chief, Home Command will be Commandant of the Air Training Corps. A.T.C. cells will be established at Home Command and at No. 18 Group, and in charge of these cells will be six retired officers who will be specially established in the rank of Wing Commander on the staff of the A.O.C.-in-C., Home Command to look after the various regions into which the A.T.C. is divided for administration purposes. They will be salaried, full-time appointments, and the officers will hold commissions. In Scotland the A.O.C., 18 Group will assume the title "Commandant A.T.C. (Scotland)".

Much, of course, will depend upon the interpretation of the duties and functions of these Wing Commanders. It is in our view essential that they should not be regarded as chair-borne administrators, but that their mission should be conceived as one of maintaining, by constant visits to Wings and even more particularly to Squadrons, close and continuous contact with, so to speak, the A.T.C. in the field. These officers should gain as quickly as possible an intimate knowledge of the origin, background and psychology of the A.T.C. We very much hope that they will be reminded that in its original conception by the Air League, which was in fact adopted by the Air Ministry at the time, the A.T.C. is not merely a pre-Service training organisation in the narrow sense. A strictly Service approach to its operation and administration will not produce the best results, and would in any case be mistaken in regard to a voluntary organisation composed of young boys. We suggest that the A.T.C., in order that the Service may obtain the greatest benefit from it, should be regarded at least in part as a youth organisation, to build character and inculcate a sound idea of its members' duties and obligations to the community.

We could have wished that the Air League's recommendation for a civilian director-general could have been adopted, because it would have facilitated the development of the A.T.C. on this side. But one great improvement will have been introduced if, that is to say, the new arrangements are operated in the spirit which we have indicated, and that is the establishment of a closer contact between the Squadrons and the local Squadron Committees, and the Commandant at the top.

The A.T.C. has now one great need, and readers of *Air Pictorial* can help to supply it. This is a greatly increased number of civilian instructors. There are among the many thousands of our readers a large proportion of former members of the Royal Air Force. We appeal to ex-officers and warrant officers in particular to offer themselves as instructors to the A.T.C. squadrons. By doing so they will be performing a service of the greatest possible value to the Royal Air Force to which, we know, they all feel strong ties of affection and loyalty. We shall be very happy to give to any of our readers particulars of their local squadrons, with which they can make contact.

THIS MONTH'S COVER

AS with all the R.A.F.'s V-bombers, the Vickers Valiant is finished a glossy white overall. The bomb aimer's cupola, flight-refuelling probe (in the nose) and fuel-jettisoning outlets (at wingtips) can be clearly seen in this photograph.

Fighter Engines 1960

By Howard S. Fowler

The Bell X-1A possessed one of the essential features of a modern interceptor—speed (it reached a speed of 1,650 m.p.h.—Mach 2.5), but the enormous fuel consumption of the rocket motor restricted the duration of flight.

IT is beginning to become obvious to project engineers working on fighter engines that the days of the large turbojet engine in the fighter aircraft are numbered. However attractive this type of engine is in the large aircraft, such as transport, bomber, or long-range fighter, it is approaching its limits in the short-range interceptor fighter.

What are the limits of the turbojet engine in the interceptor? To begin with, the jet engine's performance depends directly on the amount of air that can be rammed into its intake, and on the temperature its turbine blades can stand. And its cost depends on the advanced materials, the vast number of accurately shaped turbine and compressor blades, and the very high quality of workmanship demanded by the whole machine. The cost of a modern turbojet is well over four times that of, for example, the Derwent or Nene type, even when in full production. The new large engines as yet in relatively limited production may cost some ten times this price.

In the supersonic fighter the first consideration is to cut down frontal area to reduce the drag. So until we can develop an axial compressor with supersonic air speeds in the first stages at least of its blading, the possible size of air intakes will severely limit the airflow and therefore the thrust of the jet engine. And while the design of a subsonic axial compressor is difficult enough to keep the best aerodynamicists in the country on their toes, it is simple compared to the supersonic type. It can be made, but its operating range is limited almost to one set condition, and even there its efficiency is very poor.

The hot end of the turbojet, too, seems to be near its limit; even Titanium and cooled blading will not let us heat our turbine blades much hotter under the stresses at which they operate. A turbine blade weighing perhaps ¼ lb. is whirled round red hot with a centrifugal load of perhaps 5 tons trying to tear it out of its disc.

So apart from the obvious increase in overall size, the turbojet will soon reach its limit. The beginning of the next step is seen in the method of reheat—or afterburning. In this the jet engine is used as a supply of hot high-pressure gas for a vast fuel-burner placed in an oversized jet-pipe, which however does not increase the overall engine diameter above the normal size. This is in fact a turbojet with a ramjet mounted on the back of the turbine, and this power unit should see the interceptor fighter through its next phase. Its fuel consumption is terrific, but in a short-range interceptor this is not vital. However, its cost and weight are still those of a complex turbojet engine plus a special jet-pipe.

U.S. AIRCRAFT IN THE BRITISH SERVICES

"Chronicler" and Bruce Robertson will resume their brilliant series in January, when they will deal with the beginning of lease-lend.

But there is a way of getting right past the difficulties of weight, complexity, compressor intake capacity at subsonic gas speeds, and turbine temperatures, which has been known for a long time.

A ramjet compresses its air through the shockwaves across its supersonic intake, without any mechanical compressor at all, and therefore without any turbine to act as compressor drive. The obstacle in the past has been that until the speed of air into the intake rose to above Mach 1 (speed of sound) the shock-wave compression effect was too small to be of any use. But now that our whole aim is to fly the aircraft at Mach 2, or even faster, this becomes for the first time a paying proposition. It leads to a design with a turbojet or rocket motor to get the aircraft up to about Mach 1, and ramjets to take over from there and fly it at anything up to Mach 4.

The ramjet engine itself is merely a duct of carefully designed cross-section, containing a fuel pump, a fuel spray ring, and a flame-stabilising grid. The fuel pump is probably run by a turbine driven by compressed air tapped off the intake duct, and the control system is the simplest possible altitude-controlled valve and a pilot's throttle. The weight of the whole engine is not much more than the weight of a normal jet pipe, and the manufacturing effort and cost are correspondingly small. The only additional complication which seems at all desirable is a variable-area propelling

Another example of a rocket-powered aircraft is the Douglas D-558-2 Skyrocket. Normally carried aloft by a mother ship, the Skyrocket made several take-offs with the aid of JATO in order to determine rate of climb, which was poor. The machine illustrated is an early Skyrocket powered by a Westinghouse J34-WE-22 turbojet and a 6,000-lb. thrust Reaction Motors XLR-8 bi-fuel rocket.

The Republic XF-91 Thunderceptor was a compromise between the pure jet and the rocket-powered interceptor. Although it never entered large-scale production, it provided a glimpse of the fighter of the future.

nozzle, and since the flight would be supersonic this would have to be a convergent-divergent nozzle, instead of the normal simple convergent type. The design of such a nozzle is one of the major problems confronting the reheated jet-engine designers at the present time, so the nozzle should be available in ample time for the ramjet fighter.

The next point to consider is the type of aircraft to be powered by the ramjet engine. The present interceptor fighter is a piloted aircraft, with an ever-increasing load of automatic navigating and gunsighting equipment, armed increasingly with rocket missiles, perhaps with further guiding apparatus in the missile itself. From this state, two lines of development are to be seen in their early stages. One is to make the fighter ever more a complex flying launching platform for increasingly large and complicated guided missiles. The other trend is to remove the pilot and make the aircraft itself the missile, reducing its range until it becomes a missile with controllable stabilising fins, capable of speeds of the order of Mach 2 up to 4.

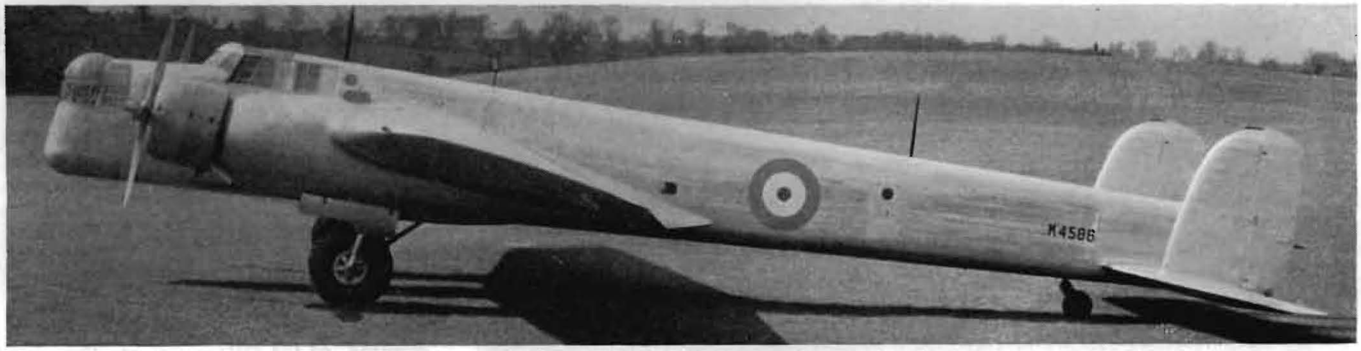
In the case of the "missile-launching" interceptor fighter, even the fighter itself must have a high top speed, otherwise it will never get near enough to the bomber to launch its missiles. This seems to allow two possible designs. The first is a semi-glider, which can get to operational altitude and remain there on a "cruising engine" for a reasonable time, say half an hour, in subsonic flight. Then when it is directed to its target, it can accelerate to supersonic flight to get within launching range of its missiles. This aircraft could be of fair size, of the "Javelin" class, for example, powered by a single large turbojet for cruising, and having two ramjets for short duration (five minutes) high speed flight attacks. And since it would attack at supersonic speed, its missiles could most profitably be simple ramjet missiles, for direct supersonic launching without any booster rockets.

The second design of missile-launching fighter is the type foreshadowed by the German "Natter" of 1944. Here we have a minimum-sized aircraft, either rocket-boosted in a vertical take-off or dropped from a parent aircraft already at high altitude. The machine consists of a ramjet motor, fuel tanks for five or ten minutes flight, a battery of rocket or small ramjet missiles, a prone pilot, and a radio receiver to pick up commands from a ground controller to lead the pilot to his target. This seems to be the simplest and cheapest interceptor fighter system available, and may be the most useful choice on this score alone.

The other general line of development is to remove the pilot and convert the interceptor aircraft into a guided missile. This is definitely a one-flight machine, so che ness and simplicity are all-important, w few worries on the score of safety devices or long-life components. At first sight there seems to be nothing to choose between rocket and ramjet motors, except that the ramjet needs rocket-boost to take off, and a large air intake. However, against this, the rocket has to carry all its fuel, including the oxygen needed for combustion. The ramjet, however, gets its oxygen from the outside air, and therefore has only half the weight of fuel to carry. The extra weight capacity can be devoted to a larger explosive warhead, or the missile can be made that much smaller, and hence faster, for the same warhead. The take-off rockets are jettisoned when burnt out, so they are no burden to the ramjet missile.

In case this makes us think that the ramjet has all the advantages over the rocket, we must remember that the ramjet can operate only as high as there is a reasonable amount of air to burn its fuel—say up to 60,000 feet. Above this the rocket which carries its own oxygen is the only solution. So that as an interceptor to attack jet bombers, the ramjet seems the best answer, and the Leduc piloted experimental fighter in France, or the Boeing "Bonmare" pilotless ground-to-air missile in the U.S.A. are the forerunners of the type. For defence against the rocket missile, which approaches its target from well above the usable-air ceiling, the rocket anti-aircraft missile of the U.S.A. "Nike" or the Swiss Oerlikon type is the probable answer.

Typical of the present trend of fighter design is the SO.9050 Trident II. The wingtip-mounted Armstrong Siddeley Viper turbojets are used for economic cruising, and the twin-barrel rocket boosts the machine to supersonic speed in a matter of seconds.



The first prototype Whitley I, K4586. It later became a ground instructional aircraft serialled 7070M.

THE WHITLEY STORY

By "Lintonian"

Part I

IN dealing with the Whitley bomber it is best, perhaps, to recall here that to this grand old warrior alone—Bomber Command's mainstay during the early years of World War II—fell the honour of being first over Germany. And this was just the beginning of a long line of "firsts" achieved by the Whitley on active service—"firsts" which followed others of equal significance in the purely technical field.

It was several years before that fateful September of 1939 that Sir W. G. Armstrong Whitworth Ltd., pioneers in the use of high-tensile steel for aircraft construction, completed their first project for a twenty-four-seat bomber-transport to Air Ministry Specification C.26/31—the A.W.23, which was the Whitley's genesis. This first project, a high-wing monoplane of 92 ft. span and 79 ft. 6 in. in length and powered by two 640-h.p. Armstrong Siddeley Tiger 2, fourteen-cylinder, two-row, air-cooled radial engines with geared fans was shelved. But a prototype of a second A.W.23 project to the 1931 specification featuring a low wing was built; this was K3585 which first flew on 4th June 1935 and remained the sole example of its type.

With the increase in size and weight of aircraft, and higher speeds, it had become evident that problems of stability and durability could best be solved by the use of aluminium alloys which by now had greatly improved in strength. The A.W.23's wing was the first component tackled, and marked the beginning of the evolution of the box spar. Fuselage construction remained of tubular steel and, apart from nose and tail extremities, was fabric covered. That part of the wing aft of the corrugated light alloy sheet box spar was also fabric covered, as was the tail unit. In its original form K3585 was powered by two 810-h.p. Tiger 6s installed in the latest type Armstrong Siddeley long-chord cowlings and driving four-bladed, fixed-pitch metal airscrews without spinners. Its large cabin could accommodate twenty-four fully-armed troops or supplies and, underneath, internal stowage was provided for bombs.

Armstrong Whitworth manually operated turrets, each mounting one .303 in. Vickers gun were fitted to nose and tail; they were of the type that later became standard equipment not only in the Tiger-engined Whitleys, but—in the mid-upper position—in the early Avro Ansons and Airspeed Oxfords and also in the de Havilland Don. Wing span of K3585 was 88 ft., fuselage length 80 ft. 8 in., and height 19 ft. 6 in. All-up weight was 24,100 lb. It was in this form that K3585 appeared in the New Types Park at the R.A.F. Display at Hendon in July 1935.

In 1936 when Flight Refuelling Ltd. was formed with Imperial Airways' support to develop a system that would enable the latter's Short S.23 Empire Boats to cover the Atlantic, the A.W.23 or Type 186 as it—and also the original high-wing project—was alternatively designated, was converted into a flying laboratory which could function, alternatively, as a fuel tanker and receiver. Extra fuel tanks were installed in the fuselage, and forward of these and partially projecting through a cut-out in the floor a hose reel was fitted. To enable K3585 to perform the other half of its dual role, a receiving cone (linked to the extra tanks by pipelines when in use) was provided in the fuselage stern, and the rear turret removed. A final item of special equipment—and one necessary in either role—was a hand-operated winch for paying out or pulling in the hose hauling line. Another major change involved powerplant: the Tiger 6s were replaced by two 845-h.p. Tiger 8s driving three-bladed controllable-pitch airscrews of Hamilton design.

Following conversion, K3585 was the first used in conjunction with the Handley Page H.P.51 receiver (J9883, the twin-engined high-wing monoplane which was the immediate forerunner of the Harrow) in a series of experiments lasting until 1937. It next began to perform both of its highly specialised duties alternately. In the flying tanker role it figured in flight refuelling tests of Imperial Airways' Short Empire Boat "Cambria" (G-ADUV) over Southampton Water; and acting as a receiver was used in conjunction with at least one (G-AFRL) of several Harrow tankers for further tests prior to the introduction of the Atlantic Service of 1939. All these tests were conducted by Sir Alan Cobham. It was at his company's works at Ford Aerodrome, near Arundel, Sussex, that the A.W.23—allotted the registration G-AFRX, although this was never taken up—was based throughout; and it was there, too, in the autumn of 1940, that its career was ended by enemy bombs which simultaneously flattened the Flight Refuelling works only a few days after the staff, plant and drawings had been dispersed to the Midlands.

With the issue of Air Ministry Specification B.3/34, Mr. J. Lloyd, Armstrong Whitworth's chief designer and his team embarked, in the latter half of 1934, upon the adaptation of their A.W.23 transport design—then still under construction—as a straightforward, long-range heavy bomber; an order for two prototypes was received that same year. The outcome was the A.W.38 Whitley 1, named after the location of the company's factory at Coventry. Later in conception than either the Hampden or Wellington, it was designed and built in eighteen months and was the first of the R.A.F.'s new generation of what were still then classified as "heavies" to appear. Serialled K4586, the first prototype (Type 188) first took the air at Baginton on 17th March 1936 in the hands of A. C. Campbell Orde, Armstrong Whitworth's chief test pilot. This was the first aircraft to fly fitted with de Havilland airscrews. In June 1936 the all-silver K4586 appeared in the New Types Park at Hendon carrying a large number "9" in black on the port side of its rear fuselage and the starboard side of its nose. Several years later it was serving at Aldershot as an Airborne Forces' ground instructional machine, serialled 7070M; its ultimate fate remains unknown. The second prototype, K4587, was fitted with two 935-h.p. Tiger 11 engines, and was known as the Type 194 (B.21/35). This machine went to the R.A.E.

A striking thing about the Whitley's construction was that the former tubular high-tensile steel fuselage structure used in the A.W.23 was replaced by one of light alloy monocoque form with stressed-skin covering, thus carrying the progress of structural design a stage further. The decision to do this represented a big advance at the time. Information as to the strength of skin-stringer combinations was scanty and large numbers of detail tests were made to provide basic information. A full-scale test at the R.A.E. produced a failure at 98 per cent of the design load. That the finished product was so strong and reliable was amply proved by the Whitley's subsequent service, mainly during the early stages of the war.

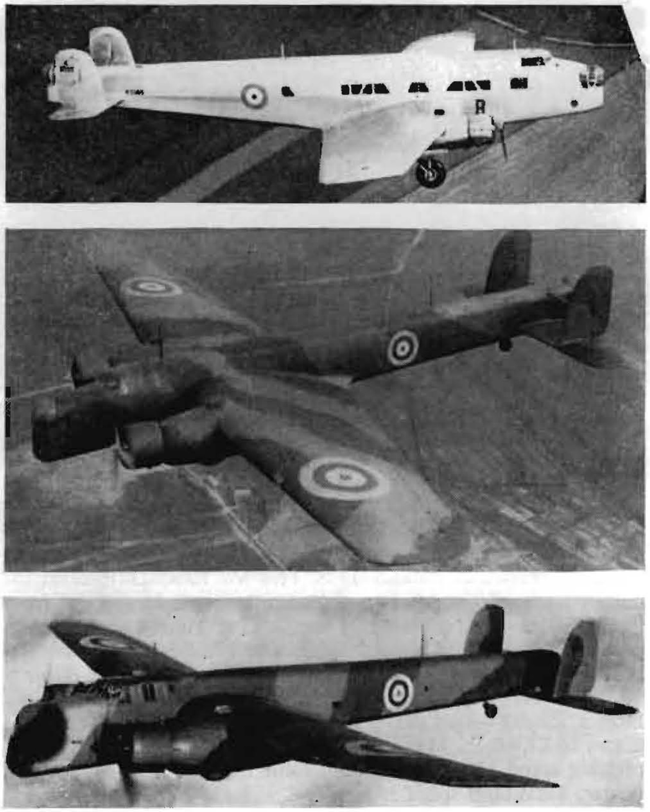
The Whitley adopted with a slight reduction in span the A.W.23's wing, although it was now fitted in the "mid" position. It was the broad, rectangular shape of the Whitley's low aspect-ratio wing that eventually led to it being affectionately dubbed "the Flying Barn Door" by its crews. And it was again because of its wing that the Whitley assumed a characteristic, markedly nose-down attitude in flight. This time, however, the exact cause was something quite different. When the Whitley was first designed, flaps had not yet made their universal appearance and so, to obtain the necessary ground angle to reduce the landing float and run, the thick, high-lift section wing had to be given a big angle of incidence—8½ degrees. As it happened, efficient trailing-edge flaps were provided on the Whitley—as they were on the A.W.23—before the prototype flew, thus enabling it to reap their additional benefits during take-off and landing.

At some stage of production—certainly from the time of K7200's appearance—the Whitley 1 began to incorporate dihedral on the outer sections of its wing. This was necessary in order to improve lateral stability and was also incorporated, retrospectively, on at least some of those machines which had left the assembly line without it. In addition to the A.W. manually operated nose and rear turrets, the Whitley 1 also retained the hydraulically operated forward retracting undercarriage which Armstrong Whitworths had designed and built specially for the A.W.23. Unlike the A.W. turret, this item remained standard equipment on all subsequent Marks of Whitley built. Fuel was carried in three main tanks—two of 182 gallons capacity each in the leading edge of the outer wing sections and one of 155 gallons in the fuselage roof, coinciding in plan view with the box spar. Extra fuel tanks could be fitted in the fuselage and with these, maximum fuel capacity was 651 gallons. Oil tanks were situated inboard of the nacelles and similarly formed the leading edge. The Whitley's bomb load of 3,365-lb was carried in two separate bays in the fuselage and in a total of fourteen smaller cells in the wing. Their doors, of wood and metal, opened under the weight of the falling bombs and were closed by bunjee.

Because of its smaller fuselage cross-section and more powerful engines, the Whitley's performance showed a great improvement over that of the A.W.23. Two 795-h.p. medium-supercharged Armstrong Siddeley Tiger 9 engines driving three-bladed de Havilland two-position variable-pitch airscrews gave the Mk. 1 a maximum speed of 192 m.p.h. at 7,000 ft., and 186 m.p.h. at 15,000 ft. Cruising speed was 160 m.p.h. at 15,000 ft. It could climb to 15,000 ft. in 27.4 minutes and had a service ceiling of 19,200 ft. Still air range was 1,250 miles. Wing span was 84 ft., length 69 ft. 3 in., and height 15 ft.; mean chord 14 ft. 4 in., wing area 1,232 sq. ft., and aspect ratio 6:18. Empty weight of the Whitley 1 was 14,275 lb., normal a.u.w. 21,660 lb., and maximum a.u.w. 23,500 lb.

Verbal arrangements to put forty Whitleys into production based on the two prototypes then under construction were made on 12th June 1935. Contracts for Whitley 1s, 2s and 3s were placed during 1935–36 as part of the Expansion Programme, and in order to fulfil them construction of the A.W.27 Ensign had to be transferred from Coventry to Hamble, Hants. Whitley production at Coventry was at first shared mainly by three factories. Fuselages and detailed components were manufactured at Whitley Abbey, the company's headquarters; panel-beating and much detail work such as section rolling, fuel tank manufacture and detailed erecting was done in some shop space temporarily taken over at the old Coventry Ordnance Works in Smith Street; wing spars were built, the wings erected and the final assembly done at Baginton aerodrome—the Coventry Municipal Airport where work was progressing on Armstrong Whitworth's large three-bay hangar. At peak production in 1942, Whitleys were being delivered from Baginton at the rate of twelve per week.

The first production Whitley 1, or Type 193 as it was known, came off the line in March 1937, just twenty months after the receipt of I.T.P. (Instructions to proceed) 421118/35 for a total of eighty Mk. 1s and 2s, and during that same month the type began to enter squadron service.



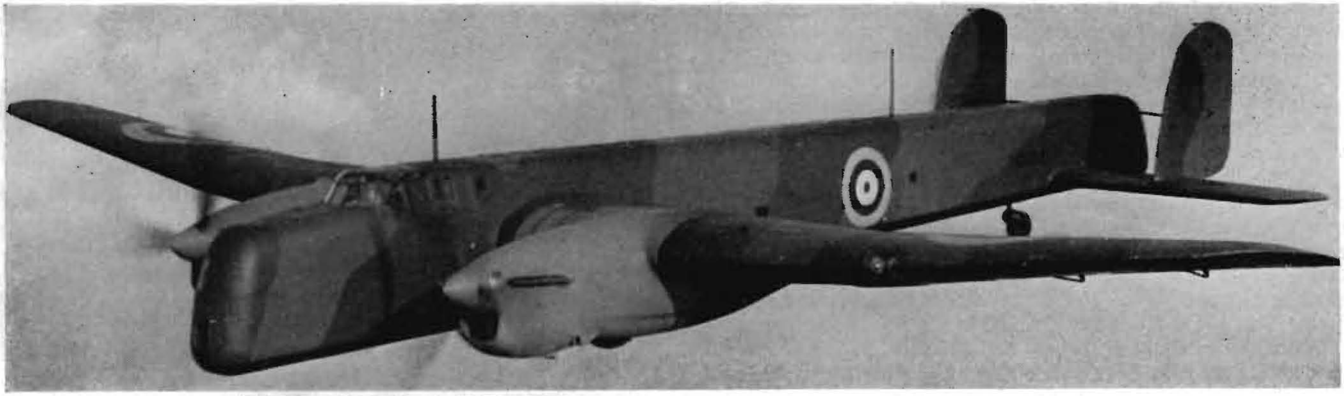
Top to bottom: K3585, the sole example of the AW.23 bomber-transport built; K7191, the ninth production Whitley I. Note the absence of dihedral on the outer wing panels; the sixth production Whitley 2, K7222, here seen before installation of gun turrets.

First to receive Whitleys—as replacements for its Heyfords which it had operated for two and a half years (it had been the first Heyford squadron also)—was No. 10 Squadron based at Dishforth, Yorkshire, and commanded by Wing-Comdr. S. Graham, M.C. One of the squadron's Whitley 1s was serialled K7185 and bore the number "10" in white for'ard of the fuselage roundels and the aircraft letter "H" aft. This machine was, incidentally, the third production machine. Another of 10 Squadron's Mk. 1s was K7194; this machine carried its individual letter ("E") on each side of the nose.

On 1st July 1937 No. 10 Squadron was one of ten units to come under the executive command of No. 4 Bomber Group which had established headquarters at Linton-on-Ouse, Yorkshire, following its move from Mildenhall, Suffolk, where it had first formed three months earlier. It was this Group which after several subsequent changes in its exact composition, ultimately became wholly Whitley-equipped and operated, progressively, all the bomber Marks; and it was with these machines, their crews and ground staff that men like Air Commodores A. T. Harris (later Air Marshal Sir Arthur, and C.-in-C. Bomber Command; and the late A. Coningham (later Air Marshal Sir Arthur, and founder of the Desert Air Force), created what constituted the world's only trained night bomber group in existence at the outbreak of the war.

In addition to the Type 194 already mentioned, were three other variants of the basic Whitley 1 designated Types 199, 201 and 204. The first-named was experimentally re-engined with two 835-h.p. supercharged Bristol Pegasus 20s; it remained a project. The Type number 201 covered the modification of K7208 to enable it to operate at 33,500 lb. a.u.w.—an experiment which in practice necessitated practically no structural alterations whatsoever. Sole external change was that the nose and tail turret positions were faired over—a change which added 3 m.p.h. to the maximum speed.

(Continued overleaf)



Fitted with Merlin 4s, K7209 was one of three Whitley 1s converted to prototype Mk. 4s.

Maximum range of K7208 in this form was 1,940 miles. Beyond the fact that the Type 204 project was also proceeded with and that it involved the first production Whitley 1, K7183 which retained its Tiger 9 engines, no information has ever come to light.

In 1937 the A.W.38 Whitley Mk. 2 appeared and it first entered squadron service in January 1938. This Mark, which fulfilled the requirements of Air Ministry Specification B.21/35 differed from the Mk. 1 in being powered by the 845-h.p. Tiger 8 engine incorporating a two-speed supercharger. The Whitley 2 was the first Service type to receive this engine and the world's first military aircraft to take advantage of the benefits conferred by the two-speed blower. Empty weight of the Mk. 2 was increased to 15,474 lb., and a.u.w. to 22,991 lb. Maximum speed was 215 m.p.h. at 15,000 ft., cruising speed 177 m.p.h. at that same height and at 66 per cent power. Maximum speed at sea-level was 185 m.p.h. and landing speed 59 m.p.h. Time to 15,000 ft. was 23.5 minutes and service ceiling 23,000 ft. Cruising range in still air was 1,315 miles. Although no true Whitley 2 prototype was built, the Mk. 1 K7209 is believed to have played that role after modifications.

A projected sub-type of the Whitley 2 was the Mk. 2 Series 1 (Type 220) powered by two Tiger engines of a Mark which remains unspecified. This Mark was not built.

Shortly after the Whitley had been designed, Armstrong Whitworth submitted a proposal to Air Ministry Specification B.1/35 for what was then—like the Whitley—a heavy bomber. Known as the A.W.39 (its alternative designation is believed to have been Type 202) this project was, in fact, a development of the Whitley and its dimensions—span 80 ft. and length 76 ft.—and layout were generally similar. The main difference lay in the power plant which consisted of the new Armstrong Siddeley Deerhound twenty-one-cylinder, three-row radial engine fitted with a two-stage supercharger and originally delivering about 1,185 b.h.p. for take-off. Two of these engines were to be buried in the leading edge of its mid-position wing. Two other differences were that the B.1/35 was heavier and incorporated a Boulton Paul dorsal turret. The B.1/35 was designed to have a range of 1,500 miles cruising at 230 m.p.h. at 15,000 ft. and carrying 5,000 lb. of bombs. Although no contract was placed for this machine (it subsequently went to the Vickers Warwick), two Deerhounds were installed for development testing in the Whitley 2 K7243. The maiden flight was made from Baginton on 6th March 1940 and the pilot was F/Lt. Turner-Hughes. The airscrews were of the de Havilland type and apart from some ballasting, K7243 was a standard Whitley.

During early tests it soon became apparent that the Townend rings fitted to the Deerhounds were preventing the cylinders from being adequately cooled. So a new cowling of the reverse-flow type was tried and this, plus an increase in cylinder fin area, made cooling much more efficient. Even so, the adequate cooling of the rear row of cylinders still remained a major problem and when K7243 was written off further work on the Deerhound was shelved. Its power of 1,350 b.h.p. for take-off was something quite fantastic in those days; and although fate did intervene, the Armstrong Siddeley Deerhound (one example still exists at the company's works today) nevertheless represents an important milestone in aero engine development.

Following the Whitley 2 down the production line was the Mk. 3 (Type 205) which incorporated increased wing dihedral to improve lateral stability still further, and improved navigational facilities. Certain other detail improvements including the adoption of a new type bomb rack which allowed bigger bombs to be carried were also made. The Mk. 3 which fulfilled the requirements of Air Ministry Specification B.20/36 had a maximum all-up weight of 24,430 lb. The Mk. 1 K7211 acted as Mk. 3 prototype and when displayed at the New Types Park at Hendon in 1937 it was minus gun turrets and had streamlined, light alloy fairings, each containing a small rectangular Perspex window, in their place. On early Whitleys the nose fairing was replaced later with an A.W. turret by Airwork Ltd. at Gatwick, before delivery to squadrons. In the case of the Mk. 3, however, the fairing was replaced by a new Nash and Thompson turret which, although still mounting only a single .303-in. Vickers gun, had the great advantage of being power-operated.

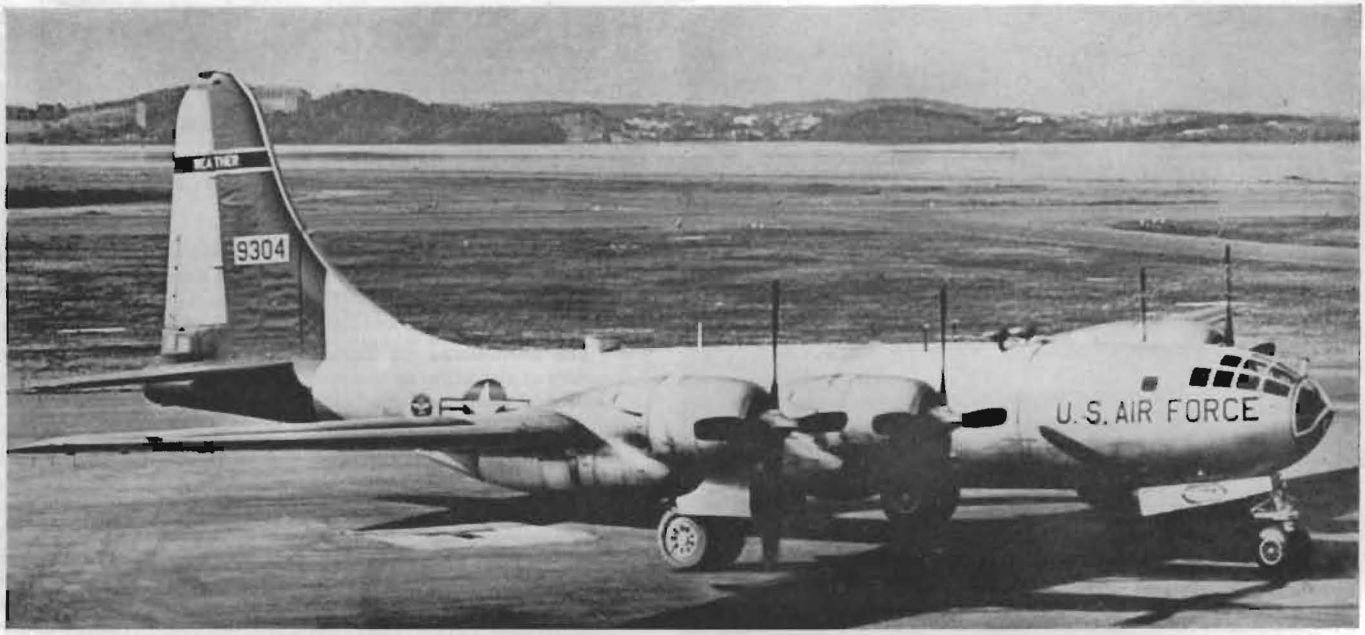
Supplementing this new nose turret and the old A.W. manually operated rear turret in the Whitley 3 was a ventral cupola or "dustbin" amidships mounting twin .303-in. Brownings; it was retractable and rotatable through 360 degrees. Although a "well" was provided in the fuselage floors of all Marks of Whitley, only in the Mk. 3 was the dustbin actually installed. Oddly enough not a single photograph of a Whitley 3 with its dustbin in the "down" position has ever been published apart from one or two distant views taken in the Baginton assembly sheds! The first Whitley 3 was delivered to the R.A.F. in August 1938. An original—and unaccepted—Mk. 3 design proposal to B.20/36 incorporating two Tiger 10 engines was designated the Type 198.

It was ten of Coningham's Whitley 3s drawn from Nos. 51 and 58 Squadrons based at Linton-on-Ouse but operating on this occasion from their advanced based at Leconfield (Linton was unsuitable for night operations at that time owing to constructional work on concrete runways) that carried out Bomber Command's first operation over Germany, on the first night of the war. During an extensive reconnaissance covering the Ruhr and North-West Germany they dropped six million leaflets or "Nickels"—the first thirteen tons of those innocuous predecessors of the "Cookies", "Block Busters", "Factory Busters", "Grand Slams" and "Tallboys" which, eventually, were to come.

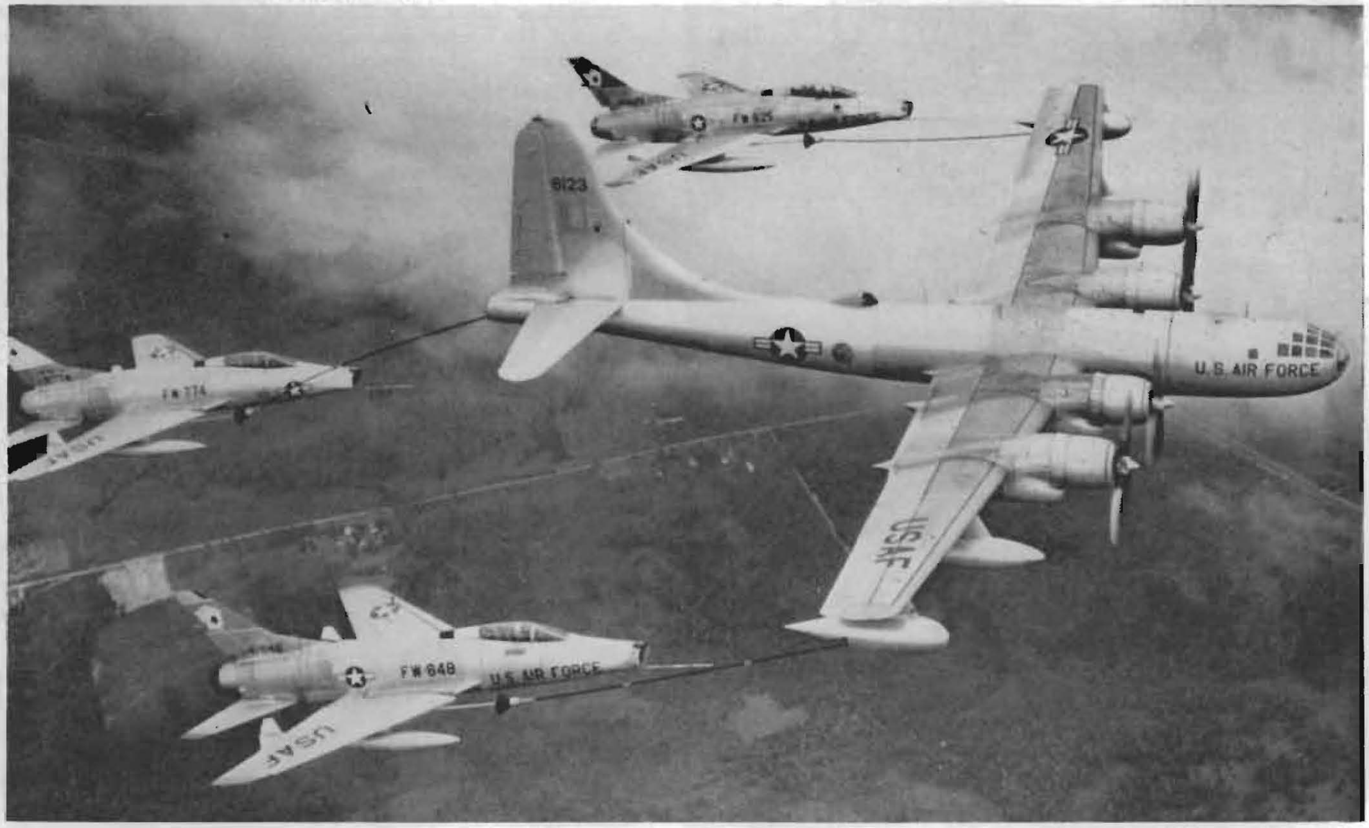
For the record the machines that took part in this historic operation were K8938, K8941 and K8982 of No. 51 Squadron (coded UT); and K8964 "R", K8969 "G", K8973 "K" (flown by Squadron Leader J. J. A. Sutton who led the raid), K8990 "L", K9006 "E", K9009 "M", and K9013 "W" of No. 58 Squadron (coded BW). These machines had been loaded with leaflets and dispersed around the perimeter at Linton ready for immediate operations as early as 1st September—the day that mobilisation was ordered.

The eightieth and last Whitley 3 was built in 1938 by which time it was already obsolete. With the substitution of two 990-h.p. Rolls-Royce Merlin 4 twelve-cylinder liquid-cooled in-line engines for its Tiger 8s, however, in that same year the Whitley gained a new lease of life. Three prototypes of the resulting Mk. 4 appeared, the former Mk. 1s; K7208 (also formerly the Type 201), K7209, and K7211, the latter had, it will be recalled, already served as the prototype Mk. 3.

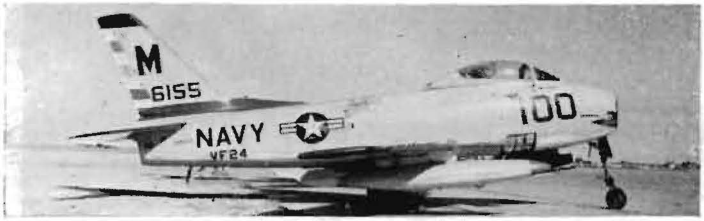
(To be continued)

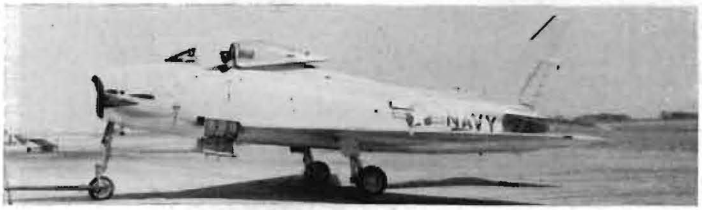


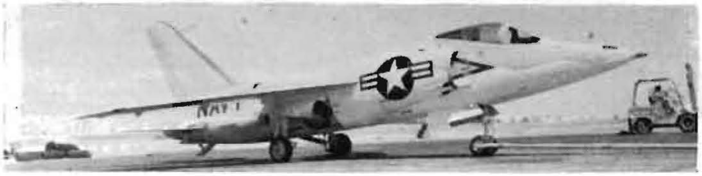
AIR WEATHER SERVICE is a part of the United States Military Air Transport Service (*see November "Air Pictorial", "Mighty M.A.T.S."*), and last year the global missions totalled 4,200. Each flight by Boeing WB-29 and WB-50D/H Superfortresses lasted over ten hours—round figure totals being: mission hours 45,000; mission miles 12½ million; and number of aerial weather observations 82,500. "Lark" reconnaissance flights are undertaken daily by the seven A.W.S./M.A.T.S. squadrons. Above is the first WB-50 (49:304) which was named "Bermuda Sunshine" at Kindley Field, Bermuda, on 19th November 1955, on the occasion of its handing over by the U.S.A.F. to the 59th Weather Reconnaissance Squadron, A.W.S. Note M.A.T.S. insigne behind fuselage U.S.A.F. insigne. (*Photo: via Esso Air World.*)

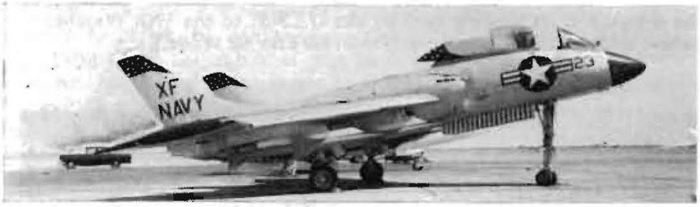


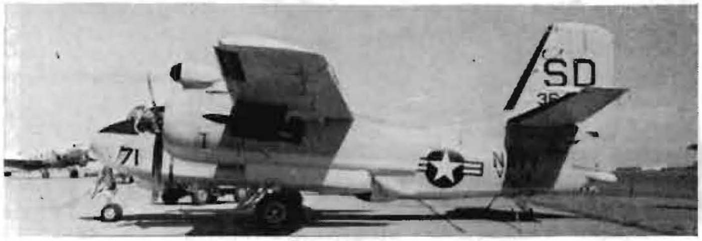
COMING SHORTLY. When North American F-100C Super Sabres occupy U.S.A.F. bases in the United Kingdom in 1957, the Hayes Aircraft-converted Boeing KB-50D Superfortress will become a familiar sight. The Hayes KB-50D will replace the KB-29P Superforts which currently refuel Republic F-84F Thunderstreaks using the single, tail-mounted "Flying Boom" refuelling system. The Hayes Aircraft KB-50D incorporates the British-developed Flight Refuelling "Probe and Drogue" system—with 80-ft. reels capable of off-loading up to 7,250 U.S. gallons of JP-4 at pressure of 120 to 200 p.s.i. Hayes Aircraft has modernised over a thousand B-25 Mitchells (B-25J to '25L).

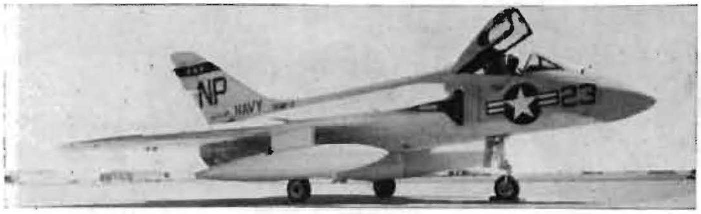


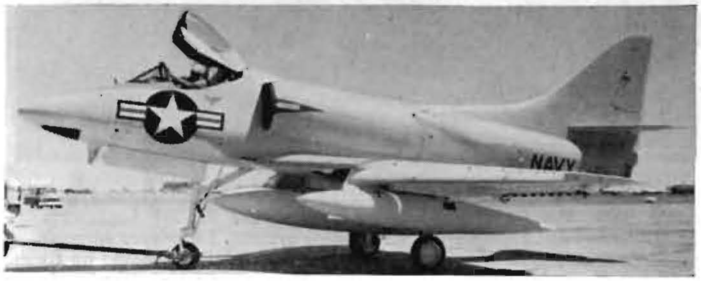












U.S. Navy Aircraft on Display

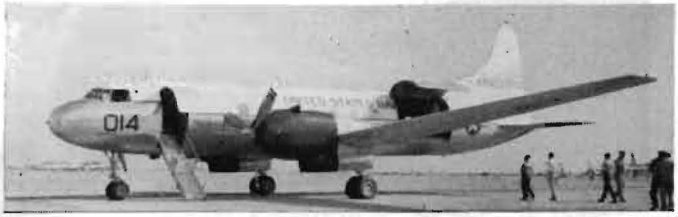
Photographs by Peter M. Bowers

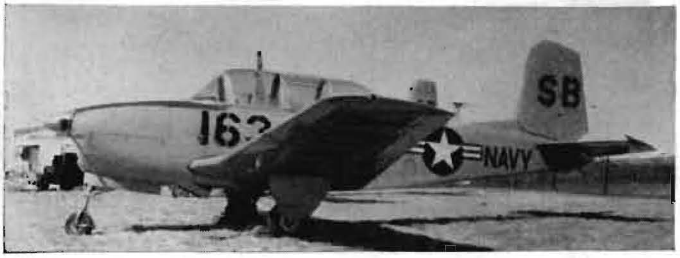
ON 1st to 3rd September America's National Air Show was staged at Oklahoma City, and on display was the might of the U.S.A.F. and U.S. Navy. Ranging from the Cessna L-19B Bird Dog to the giant Convair B-36H, an impressive array of aircraft was on show.

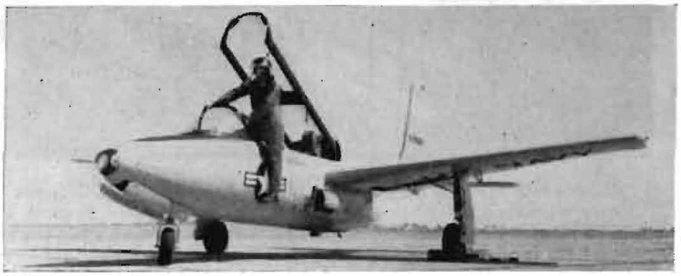
The illustrations on these pages give some indication of the variety of aircraft in service with the U.S. Navy, and in comparison the Royal Navy, so far as aircraft are concerned, lags behind.

A brief description of the U.S. Navy aircraft taking part in the Oklahoma Air Show follows, including the serial numbers.

Left-hand column, page 416, top to bottom. *Photo* 1: North American FJ-3 Fury (136155) which differs from its predecessor, the FJ-2, in having a 7,220-lb. s.t. Wright J65-W-3 turbojet in place of the General Electric J47-GE-27. *Photo* 2: North American FJ-4 Fury (139300). Latest in the line of Furies the FJ-4 has been extensively redesigned and has a new wing of increased chord. *Photo* 3: Grumman F11F-1 Tiger (138623) is intended primarily as an air superiority fighter. Production aircraft are powered by an afterburning Wright J65-W-4 turbojet. *Photo* 4: Chance Vought F7U-3M missile-launcher Cutlass (139871), equipped with Sperry Sparrow missiles. This model is a sub-variant of the F7U-3, which in turn is an extensively redesigned F7U-1. *Photo* 5: Grumman S2F-1 Tracker (136482) with underwing missiles, is now in production for the U.S. Navy and Royal Canadian Navy. The Tracker carries a large offensive load which can include torpedoes, depth-charges, or mines, in addition to a built-in armament of 20-mm. cannon. The fuselage houses radar and magnetic airborne detection equipment. Another version is the TF-1 Trader Transport. *Photo* 6: Douglas F4D-1 Skyray (134780) with external long-range tanks.





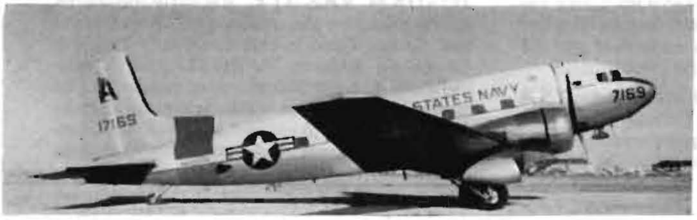


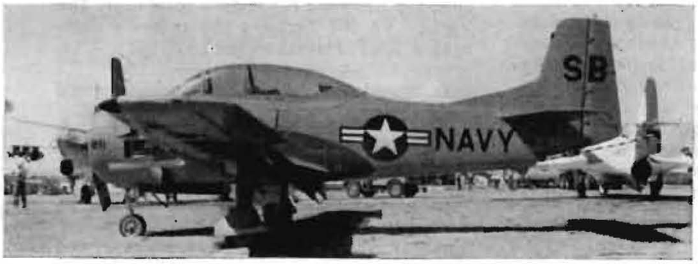
The F4D-1 will soon be succeeded by the F4D-2N, which has all-weather radar. *Photo* 7: Douglas A4D-1 Skyhawk with external long-range tanks. America's conception of a light fighter, the Skyhawk weighs 11,000 lb. and was the first U.S. aircraft of delta planform to utilise a tailplane.

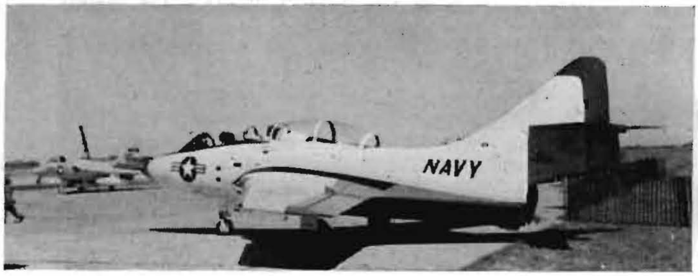
Right-hand column, top to bottom. *Photo* 1: Convair R4Y-1 personnel-cargo-hospital transport capable of carrying twenty-seven stretcher cases or forty-four seats. *Photo* 2: Beech T-34B Mentor (140913) primary trainer. Developed from the Model 35 Bonanza, the Model 45 Mentor is in service with the Chilean, Colombian and Canadian air forces. Maximum speed 188 m.p.h. *Photo* 3: Temco TT-1 (N78856) trainer. The Temco private-venture Model 51 jet trainer made its first flight in July last and is now being evaluated by the Navy. Maximum speed 300 m.p.h.

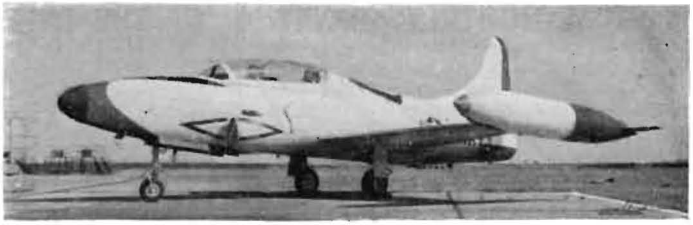
Right-hand column, page 417, top to bottom. *Photo* 1: Lockheed T2V-1 SeaStar, which is basically an improved and more powerful version of the TV-2 (T-33A) advanced trainer. *Photo* 2: McDonnell F3H-2N Demon (133610f) is an extensive re-design of the F3H-1N. The F3H-2N has an increase of 15 per cent in wing area. *Photo* 3: Bell Model 61 HSL-1 (129853) was specially designed for anti-submarine duties and carries dipping sonar equipment for detecting submarines. *Photo* 4: Chance Vought F8U-1 Crusader carrier-borne local air superiority fighter is the first U.S. aircraft to employ a two-position incidence wing. *Photo* 5: Douglas YA3D-1 (135413) is the Navy version of the B-66B Destroyer. The YA3D-1 will be the largest of the more-than-one hundred plane complement of the *Forrestal* carrier. *Photo* 6: McDonnell F2H-3 Banshee (126470) long-range, all-weather fighter. A total of 175 F2H-3s have been delivered, and this model was superseded by the F2H-4. *Photo* 7: Douglas AD-5 (132646) multi-purpose version of the Skyraider. The AD-5N illustrated is a night-attack machine.

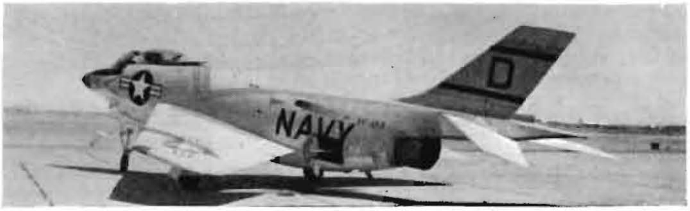
Left-hand column, top to bottom. *Photo* 1: Douglas R4D-8 Super DC-3 (17169) is an extensive modification of the C-47. *Photo* 2: North American T-28C Trojan two-seat basic trainer (140528) was designed as a replacement for the T-6G Texan. *Photo* 3: Grumman F9F-8T Cougar two-seat trainer (142439) is the Navy's first transonic operational trainer, and was developed from the **F9F-8 Cougar.**

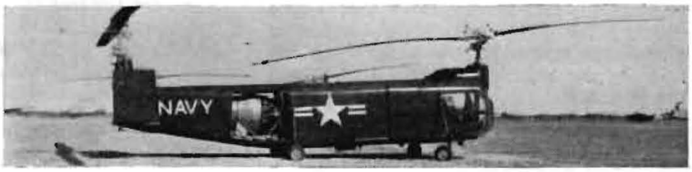


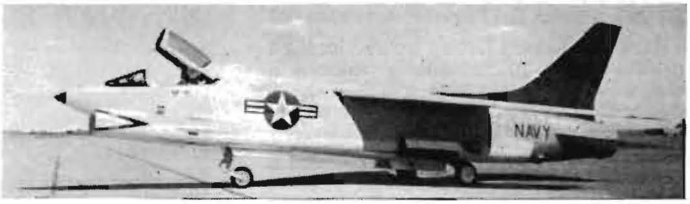


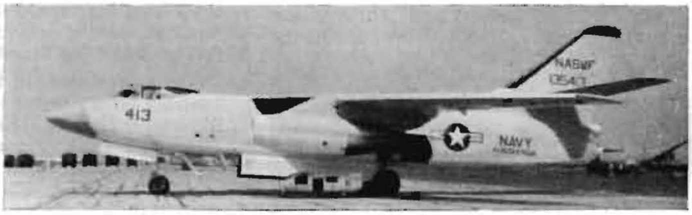


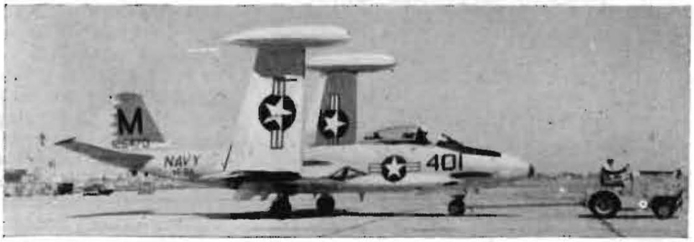


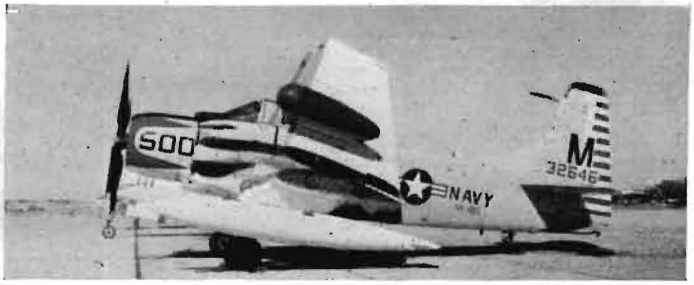












A MONTHLY SURVEY N OF THE LATEST

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DEVELOPMENTS S IN AVIATION

GREAT BRITAIN

FIRM orders for the Edgar Percival E.P.9 total seven aircraft, and it is now going into full production. Eleven machines are in production, and a total output of 150 is planned for 1957. A military version of ambulance layout is now under consideration by the British Army, the R.A.F. and the R.A.A.F.

Officials of Czechoslovakia's national airline have expressed interest in visiting the Vickers Viscount production line at Hurn. It is reliably reported that they are interested in the possibility of using Viscount replacements for their current Il-12 fleet.

Hawker Siddeley Group are developing a private-venture piloted fighter which it is claimed will have a top speed of 1,800 m.p.h. It is reported that the prototype will fly during June/July 1958.

Latest mark of Gloster Javelin revealed is the FAW.5, twin-Sapphire all-weather fighter. Already in production, it is externally similar to the FAW.4.

Ministry of Transport and Civil Aviation plans to re-open Gatwick airport during the early part of 1958.

Final trials of the Short S.B.5 research aircraft with the full 69-degrees wing sweep configuration, will soon take place. The possibility of fitting an auxiliary turbojet under the fuselage is being considered.

Latest order for six eight-seat Series 5 de Havilland Doves by the Iranian Oil Consortium brings the total number of Doves sold to 486 (476 delivered).

Squadron Leader Neville Duke has retired from high-speed test flying at Hawker Aircraft and he will be succeeded by his former assistant, Mr. A. W. Bedford.

The Government of Finland has signed a contract for a number of Folland Gnat light fighters. Deliveries will begin towards the end of 1958. Finnish newspapers put the number of Gnats ordered at 12.

It is reported that the Saro SR-53 mixed-power-plant fighter will have the de Havilland Gyron Junior as its turbojet.

AUSTRALIA

QANTAS Empire Airways recently took delivery of the first Lockheed Model 1049H passenger/cargo Super Constellation (VH-EAM). Modifications include extra-large door and stronger flooring. It can carry twenty tons of freight and be converted to carry ninety-two passengers.

Production of the Avon-powered N.A. Sabre has been cut to two planes per month. Previous production was three per month and a figure of four to five had been projected. Fifty Avon-Sabres have been delivered to the R.A.A.F.

Boeing B-47 Stratojets of S.A.C. will fly to Australia in December. During their stay the crews will be the guests of the R.A.A.F.

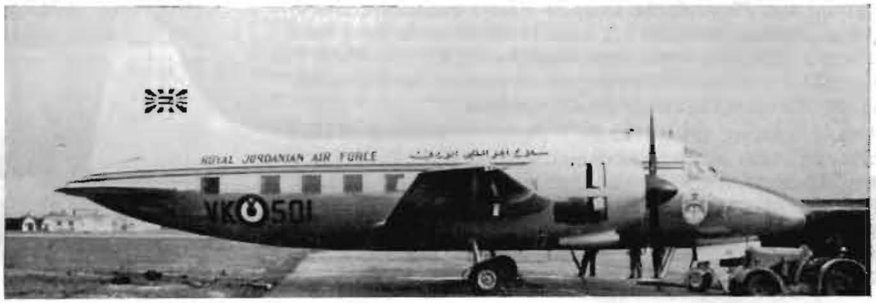
AUSTRIA

FIRST post-war aeroplane to be constructed in Austria is the O.K.-15, a side-by-side two-seater powered by a 105-h.p. Walter Mikron. Span is 24 ft. 9 in.; max. speed 137 m.p.h. and cruising speed 124 m.p.h.

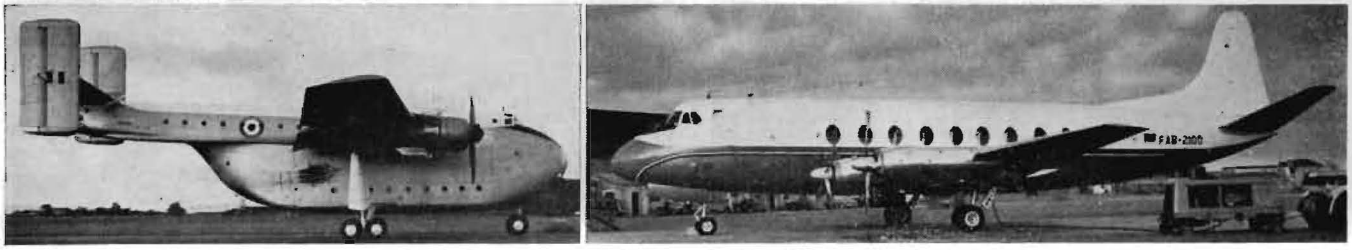
Austrian Air Force will take delivery of its first jets, fifteen de Havilland Vampires, during the early part of next year.

CANADA

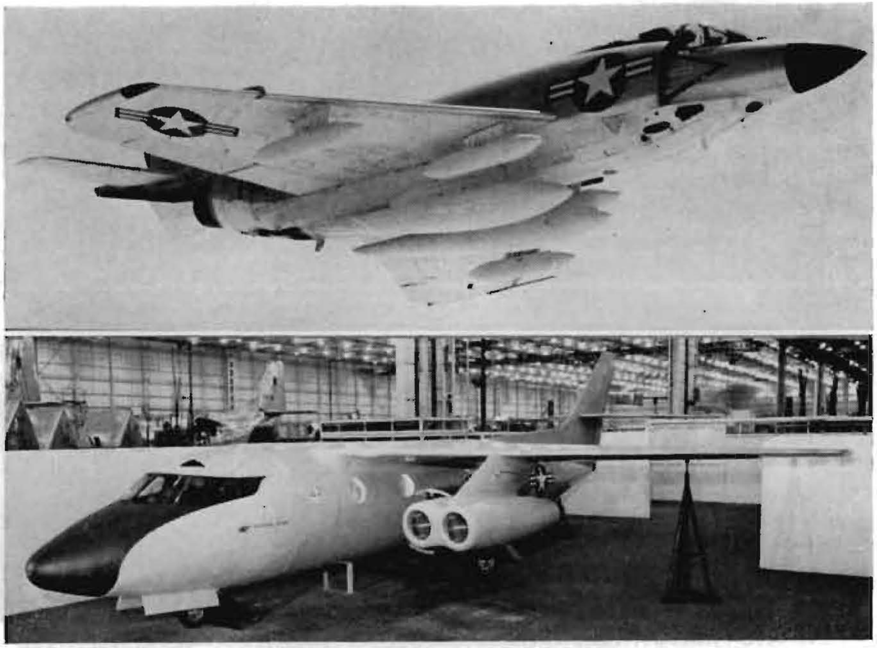
FIRST production batch of Avro Canada's CF-105 delta-wing fighters will be powered by Pratt & Whitney J75 engines



JORDAN VARSITY. Recently flown to Amman for the personal use of King Hussein and Queen Dina is this ex-R.A.F. Training Command Vickers Varsity T. Mk. I (ex-WF416). The £80,000 worth of conversion to create VK-501 was undertaken at Blackbushe by Eagle Aviation Services, Ltd. Immediate external differences include the disposal of the ventral pannier, wing fences and twin D/F loops. The Royal Jordanian Air Force standard on the fin is new. Power is two Bristol Hercules 264s and crew in specially designed flight deck total four. The Varsity VK-501 replaces the severely damaged R.J.A.F. Marathon (also VK-501).



BIG BOOST for XB259, the first production Blackburn & General Aircraft Beverley C. Mk. I (c/n. B. & G. 1002) (*left*) during recent R.A.T.O.G. trials at Brough, E. Yorks, is supplied by ten Napier Scarab solid-fuel rocket units. Depending on load carried, the Beverley can be rocket-assisted by two, six or ten Scarabs. Using the maximum ten, with an a.u.w. of 135,000 lb. the unstick run is reduced to a mere 400 yards. (*Right*) The 150th Vickers Viscount production model—a Series 742 V.I.P. version, one of two (FAB-2100 and FAB-2101) destined for the Brazilian air force.



PODS AND PODDED (*top*) A McDonnell F3H-2N Demon powered by an afterburning-rated, 15,000-lb. s.t. Allison J71 turbojet illustrates the extensive podding required to extend the range and firepower of this carrier-borne, U.S. Navy night fighter. Central cluster consists of two "king-size" drop tanks. Under each wing are two rocket-container pods. Under air intakes are four 20-mm. cannon. (*Bottom*) Mock-up of the new Fairchild M-185, ten-seat, business executive jet transport. Three of these four-jet transports have been ordered for 1960 by the U.S. Continental Can Company. The M-185 will cruise at 550 m.p.h. up to 45,000 ft. altitude.

instead of Pratt & Whitney J57s. It is planned to convert to the Orenda Iroquois some time during 1958. The Iroquois is expected to have a thrust of considerably higher than 20,000 lb. in its later development stages.

An integrated electronic weapons system for the CF-105 will be developed by the Radio Corporation of America. A multimillion dollar contract was recently awarded to the Corporation for this project by the U.S.A.F. on behalf of the Canadian Department of Defence.

Prototype of the DHC-4 Twin-Otter being developed for the Canadian Army is expected to fly at the beginning of 1958.

One hundred Sabre 5s of the R.C.A.F. Air Division in Europe are being returned to Canada. They will be replaced by the Sabre 6s and CF-100s.

CHINA

COMMUNIST China has produced its first jet aircraft, claims Peking Radio, and regular production will commence shortly. No indication was given in the broadcast of the type of machine constructed.

Peking Radio also claims that Russia's first atomic-powered aircraft will be capable of speeds in excess of 600 m.p.h. It also stated that a Russian aircraft has flown with an atomic reactor aboard.

FRANCE

AIR FRANCE has ordered Lear L-17 automatic pilots for its SE.210 Caravelle jet transports. The new system uses transistors instead of vacuum tubes.

Sud-Est is considering the Pratt & Whitney J75 for its Mark II Caravelle as well as the Rolls-Royce Conway.

Area rule is being applied to the NATO-sponsored Breguet 1001 Taon light fighter. First prototype is expected to fly early in the new year.

GREECE

THE organisational and route plans of National Greek Airlines (TAE) will be completed within the next few weeks. Final structure of the airline may include close association with one or more airlines, either American or European.

ITALY

THE Agusta AZ-8 twin-engine transport is now in an advanced state of construction and is expected to make its first flight in January next.

North American all-weather F-86Ks assembled at the Fiat factory in Turin under the U.S. Mutual Defence Assistance programme for the French T.A.F. are now at Lahr Air Base, Germany.

JORDAN

THE Vickers Viking (VK-500) of the Royal Jordanian Air Force—formerly the Arab Legion Air Force—recently airlifted to Amman a de Havilland Chipmunk primary trainer. This Chipmunk is ex-G-AOTO, *writes David H. Cotterell*, and is destined for the R.J.A.F.

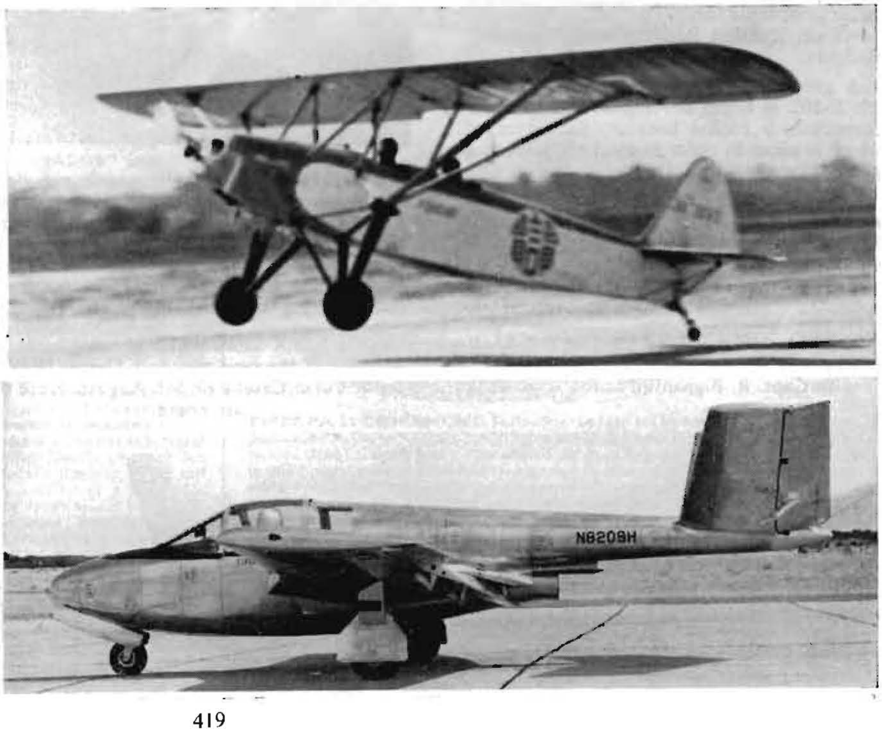
SPAIN

HISPANO-AVIACION S.A.'s light fighter project has been officially designated XC-6. Designed by Willi Messerschmitt, the XC-6 is a delta-wing aircraft to which area-rule has been applied. Factory designation is HA-300.

Another light fighter project is the Casa-Heinkel XC-7—which also features a delta wing—now being developed by the Construcciones Aeronauticas S.A. The XC-7's factory designation is CH-101.

(*Continued overleaf*)

EAST & WEST training types (*top*) The Tachihi R-52, also known as the Tachikawa R-52 appears with a new cowling shape. The original uncowled 130-h.p. Shinphu 2 radial is replaced by a 140-h.p. Lycoming O-290D flat-four which permits a cruising speed of 84 m.p.h. at an a.u.w. of 1,920 lb. (*Bottom*) A photograph of the Carma VT-1 Weejet which was featured in silhouette form in the November issue.



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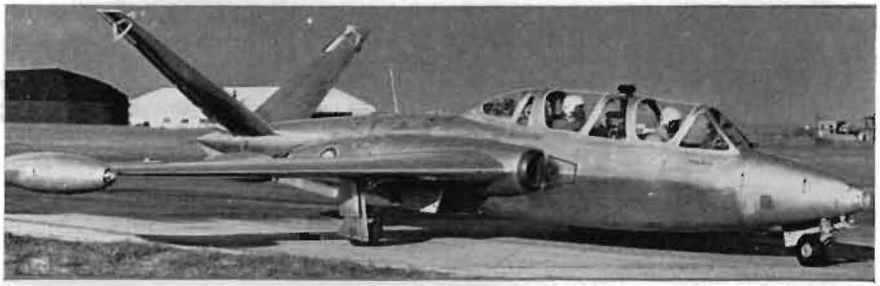
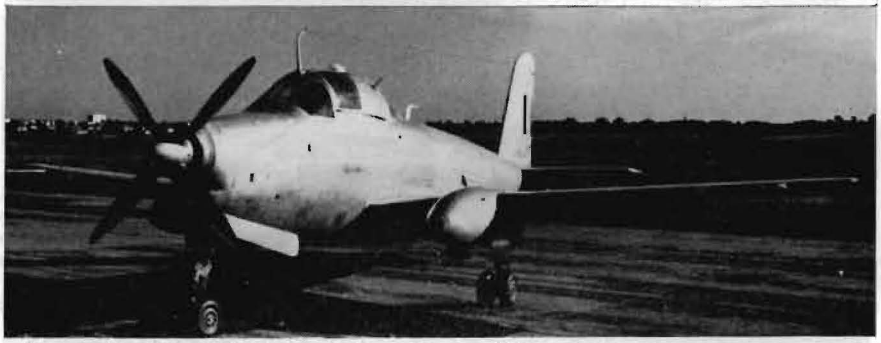




FOR THE FRENCH NAVY. *(Top)* Prototype Air-Fouga CM 170 M Magister is one of two ordered by the French naval air arm for deck-landing training evaluation. The air force CM 170 R is used for jet training—the original order for 195 has now been increased to 325. *(Bottom)* First prototype Bréguet Br. 1050 Alizé (Trade-wind) is a three-seat, carrier-based anti-submarine "hunter-killer" in the same category as the Fairey Gannet. Developed from the Br. 960 Vultur, the Alizé is now ready for initial flight trials. Power is a Rolls-Royce Dart RDa.6 (Mk. 510). Five pre-production and 100 Br. 1050s are on order. Radar is contained in the leading-edge bulges.

U.S.A.

DOUGLAS design office is conducting studies for an aircraft that would be capable of speeds within the Mach 4 to 5 range where skin temperatures would normally be 1,500°F. One possibility under consideration to keep skin temperatures down is the use of a porous skin and coolant.

Triton missile, designed for the U.S. Navy by the Johns Hopkins University's Applied Physics Laboratory, is expected to reach a speed of just under Mach 2.5. The Triton has a diameter of just under 5 ft., a length of 45 ft. and a weight of 19,000 lb.

Lockheed has developed a supersonic escape ejection seat designed to permit safe escape at 800 m.p.h. at sea-level and Mach 3 at altitude. Wind-tunnel and free-flight model tests of the seat have been made; full-scale rocket sled tests are under way and production will commence in the latter half of next year. Features of the Model D, as it is called, are side fins extending below bottom of seat, horizontal vanes to limit roll velocity, and head supports which clamp on each side of flying helmet.

Convair's supersonic B-58 Hustler bomber began its taxi-ing trials on 29th October and made its first flight on 11th November. Approximate dimensions of the Hustler are: span 55 ft., length 95 ft., and height on ground 30 ft.

Name of the Beechcraft Badger twin-engined executive aircraft has been changed to Beechcraft Travel Air, because the U.S.A.F. is afraid that in event of an air attack on the United States there might be some confusion between identification reports on Russian Badgers and Beechcraft Badgers.

A ground-level seat-ejection catapult for the F-102 is being developed. The seat incorporates a rocket booster, the thrust of which is offset in order to eject the pilot in a partly rearward direction.

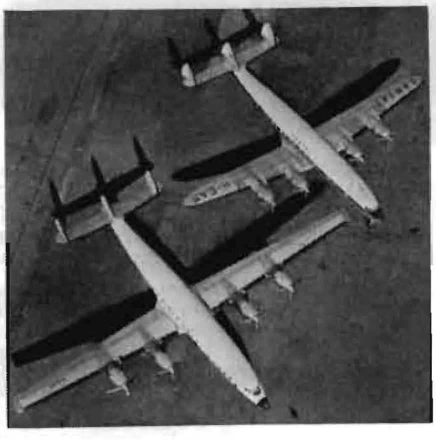
Douglas Aircraft has revealed further details of the C-132 turboprop transport. Powered by four Pratt & Whitney T57 two-spool engines of 15,000 h.p. each, the C-132 will weigh more than 500,000 lb. The high-mounted wing will be of high aspect-ratio and have acute sweepback; tail surfaces will also be swept and a long dorsal fin will extend forward along the fuselage. Fuselage will be of double-bubble configuration and main landing gear will consist of sixteen wheels.

A Hiller VTOL aircraft designated X-18 is to have a Fairchild C-123 Provider fuselage and two Allison T40 turboprops. The wing will be of entirely new design.

U.S. Army has ordered six Bell YH-40 turbine-powered helicopters for service and environmental testing. The YH-40 is a lightweight design powered by a Lycoming T53 free-turbine engine.

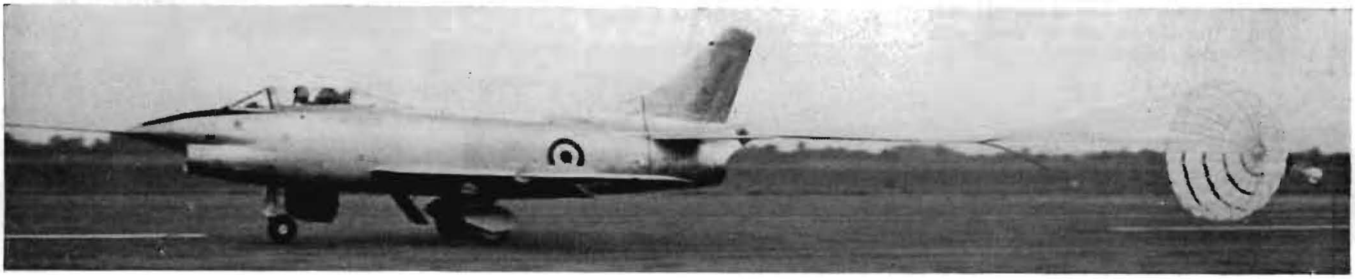
In-flight refuelling equipment of the Douglas B-66 Destroyer twin-jet light bomber has been fully air-tested and will be built into production models of the B-66B, RB-66B and RB-66C. Method used is the probe and drogue.

Details have been released of the Philco/Martin/AAMN-7 Sidewinder air-to-air missile. Length is between 8 ft. and 9 ft. and it is stabilised by four rear fins and four front fins. It is guided to its target by an infra-red homing device.



S.S. CONNIE. This helicopter's eye-view of the new Lockheed Model 1649A Super Star Constellation (N1649) compared with an Australian QANTAS Model 1049H (VH-EAM), one of the new convertible passenger/cargo Super Constellations. Note the "V" is missing in the wing registration.

ORPHEUS-POWERED FIAT G.91. Resembling the F-86K Sabre which is being built at Fiat's Turin factory, the Fiat G.91 is designed to the N.A.T.O. specification for a tactical light fighter—of the type pioneered by W. E. W. Petter's Folland Gnat. First flight of the G.91, with Capt. R. Bignamini at the controls, took place at Turin/Caselle on 9th August. Note the ribbon tail 'chute and the amidships, ventral air brake.



U.S. Army is interested in a Douglas STOL-VTOL design, which was originally intended as a replacement for the DC-3. After studying and abandoning helicopters, Douglas maintained their interest in STOL-VTOL aircraft and several commercial projects have been studied.

Nagler NH-160 co-axial helicopter test-bed has just completed ten hours flying time. The NH-160 has a normal overhead main rotor and a lower rotor located beneath fuselage. Crankcase of the McCulloch engine drives upper rotor, and the crankshaft drives the lower, thus eliminating transmissions and gearboxes.

Remotely controlled drone versions of the Ryan L-17 Navion 205 which can reconnoitre behind enemy lines and transmit a TV picture to ground commanders, are undergoing evaluation by the Army Signal Corps. Temco Aircraft converted six L-17Bs into QL-17s and developed the portable ground station equipment. Maximum range of the TV transmitters is forty-five miles.

Cessna has studied designs for a business-plane version of its twin-jet T-37A trainer, now in production for the U.S.A.F. It is claimed that a civil T-37A could be marketed at a moderate price. Production of the military T-37A is expected to run to 500 aircraft.

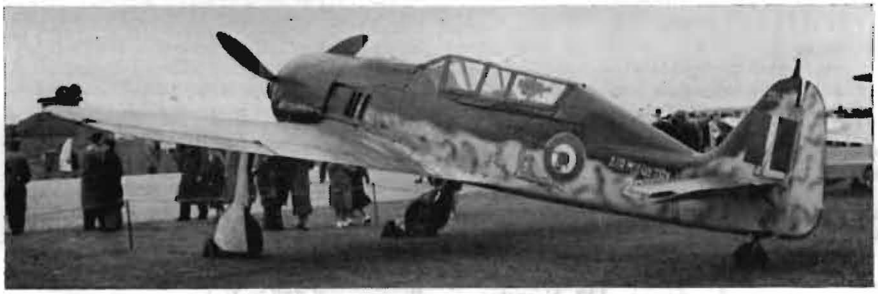
Contracts for the design of a small gas turbine in the 250 h.p. class have been awarded by the U.S. Navy to Continental, Studebaker-Packard, and Turbomotors Division, Curtiss Wright Corp.

Bell X-14 experimental VTOL aircraft, reportedly complete except for the installation of engines, will be powered by two Armstrong Siddeley Viper turbojets.

Hayes Aircraft Corp. will install two auxiliary General Electric J47-23 turbojets on a Boeing KB-50 tanker in an endeavour to save the aircraft from an early obsolescence. A J47 will be podded under each wing to give the KB-50 enough additional speed and altitude to operate with current U.S.A.F. fighters. Hayes are also working on a contract to convert B-50 bombers into KB-50 three-point refuelling tankers. A battery of spotlights, which includes a rotating beacon on top of the fin, have been fitted to aid night refuelling. *(A photograph of the first of these machines appears on page 415 of this issue.)*

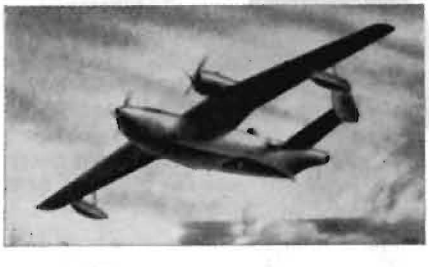
Convair's chief test pilot, Mr. J. F. Coleman, has designed a tail-less light aircraft powered by a 215-h.p. Franklin engine driving a pusher propeller. A prototype of this aircraft, which is claimed to be a roadable amphibian, is under construction.

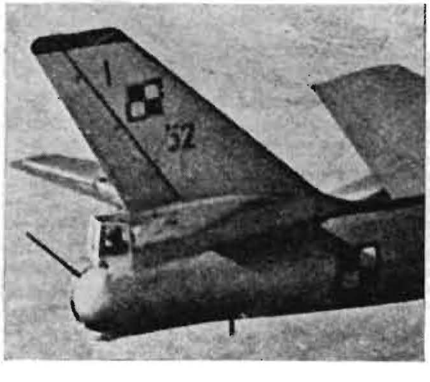
(Continued overleaf)



WHILE attending the Battle of Britain display at R.A.F. Little Rissington, I saw a two-seat Fw 190 (writes our correspondent, J. Meadow, of Cheltenham). The R.A.F. officer in charge of the machine at the display informed me that it had been stored at Wroughton, an R.A.F. aerodrome near Swindon, since the war.

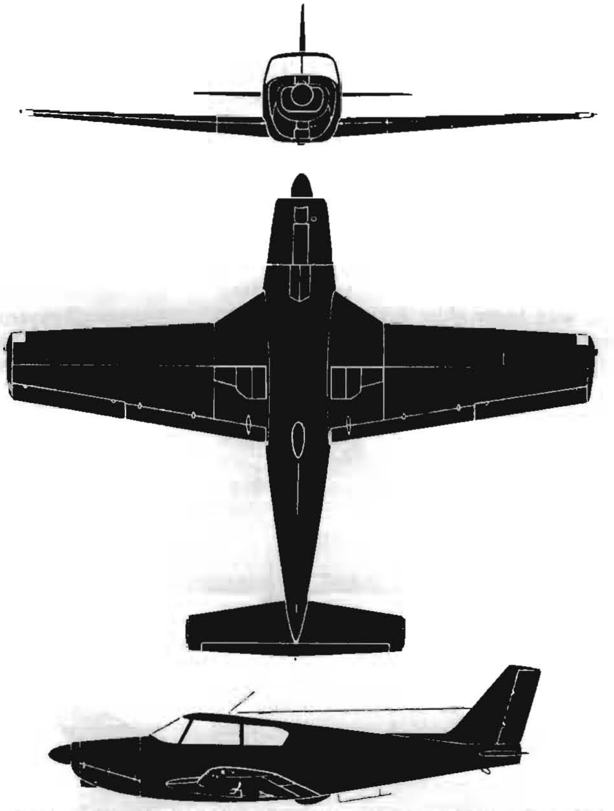
The Fw 190*A*-8/*U*1 *was a tandem two-seat development of the standard single-seat Fw* 190*A*-8 *intended to train former Ju* 87*D dive-bomber pilots for ground support tasks with attack variants of the Focke-Wulf fighter. On* 23*rd January* 1944 *the first of two prototypes of the Fw* 190*A*-8/*U*1 *was flown; the prototypes being intended to serve as patterns for forward maintenance units which were to rebuild a limited number of Fw* 190*A*-8 *fighters for the training role. Only one such conversion was completed. To these facts, William Green adds the following comments*: "*The Fw* 190*A*-8/*U*1 *possessed full dual controls and carried an armament of two* 13-*mm. MG* 131 *machine guns. A gun camera was also fitted. The two prototypes bore the Werke numbers* 0011 *and* 1133, *and as that seen at Little Rissington still retains the Werke numbers* 584219, *it may be presumed to be the sole conversion made by a Luftwaffe maintenance unit.*"





MYSTERIOUS "MADGE" *(top)*

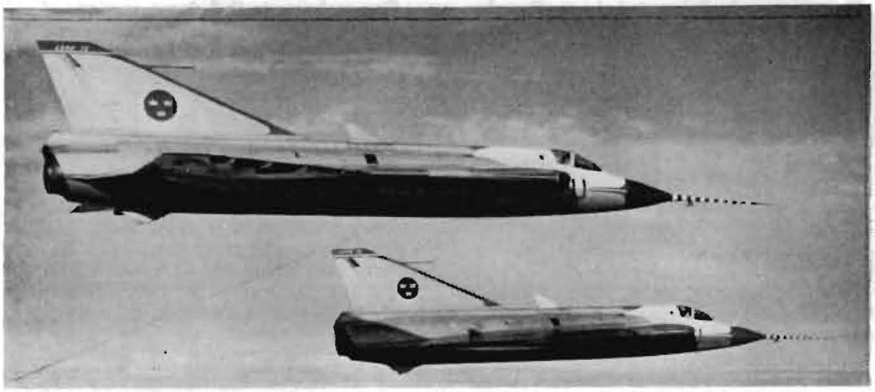
First illustration of the elusive two-motor Soviet flying-boat N.A.T.O. code-named "Madge" and believed to be the Ber'yev Be-6. Several of these 2,000-h.p. ASh-73-powered flying-boats have been observed in civilian markings alongside Soviet-built GST licence-built Catalinas on Moscow's Khimki Reservoir. Estimated max. speed is 240 m.p.h. for an a.u.w. of 60,000 lb. A version with two Klimov VK-1 (Nene-type) turbojets is reported to be the Be-8. (*Courtesy U.S. Naval Aviation News*). (*Bottom*) An excellent close-up of the tail gun position of a Polish air force Ilyushin IL-28 (N.A.T.O. code name "Butcher"). Normal armament is two power-operated 20-mm. cannon but this view suggests a single cannon mounting.



PIPER PA-24 COMANCHE. Following the lead set by naming the two-motor, four-seat PA-23 the Apache, the latest in the long line of Piper light aircraft is also named after a famous Red Indian tribe. Like the PA-23 the new PA-24 Comanche is of all-metal construction and is intended to supersede the strut-braced, high-wing PA-22 Tri-Pacer—offering improved all-round performance and greater room for the pilot and three passengers. Some idea of the market which the PA-24 Comanche will share with the twin-engined PA-23 Apache can be gauged from last year's production figures. No fewer than 974 PA-20/PA-22 Pacer/Tri-Pacer and 291 Apaches were constructed and the turn-over this year is expected to be in the region of $20,000,000—more than £7 million sterling. The first flight of the Comanche was on 23rd May 1956 some five years after the Tri-Pacer which the PA-24 is replacing on the Lock Haven, Penn. production lines. No performance figures or a detailed specification are available for publication. The power-plant is the latest Lycoming flat-four to go into production, the 180-h.p. 0-360. This four-cylinder, air-cooled engine also powers the new Beechcraft Model 95 which is now to be called the Travel Air.

WORLD-AIR-NEWS

(*Continued from previous page*)



FLYGVAPNET J35 DRAKEN. Two of the three flight-prototype SAAB J35 Draken (Dragon) single-seat jet interceptor "double-deltas" show external modifications including ventral wing fences on the outer panels and vertical surfaces forward of the fins. This triangular mounting contains radio antenna. In about three years' time the J35 will replace the British-built Hawker Hunters now used for metropolitan defence.

Pratt & Whitney recently began flight testing their T 57 turboprop installed in the nose of a Douglas C-124 transport.

U.S. Navy development contract has been awarded to Pratt & Whitney for the J58, a split compressor turbojet believed to be the successor to the J75, with a thrust beginning at 20,000 lb. Latest commercial jet engine designation is JT9, thought to be a turbofan or bypass design.

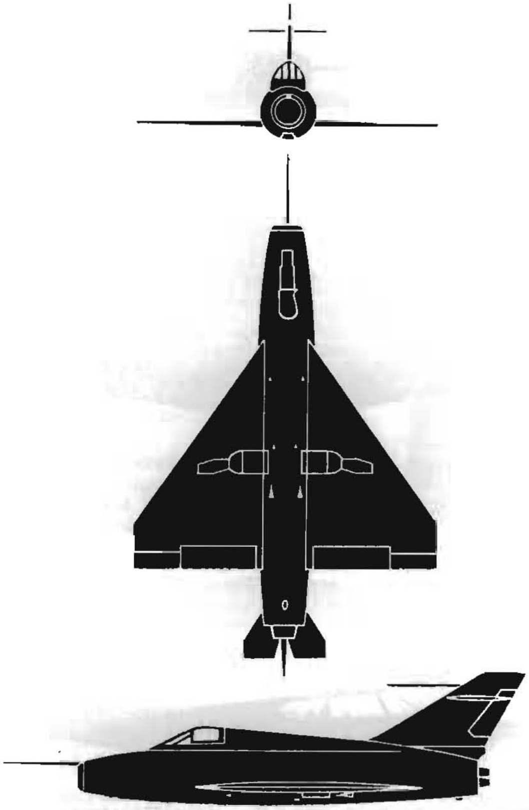
WEST GERMANY

FIRST German-made muffler of jet aircraft has been developed by Werner Genest, Stuttgart-Degerloch. Named Jonny, the muffler is mobile and weighs about 7 tons.

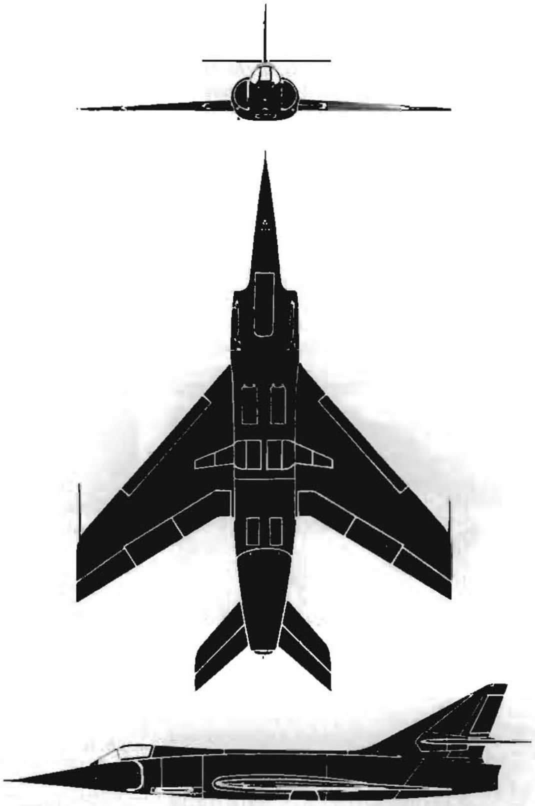
Power plant for the Dornier Do 27 and Piaggio P.149D, the Lycoming GO-345 will be built under licence by BMW at its Allach plant.

On 13th November the first delivery of twenty Republic F-84F Thunderstreaks were accepted by the new Luftwaffe.

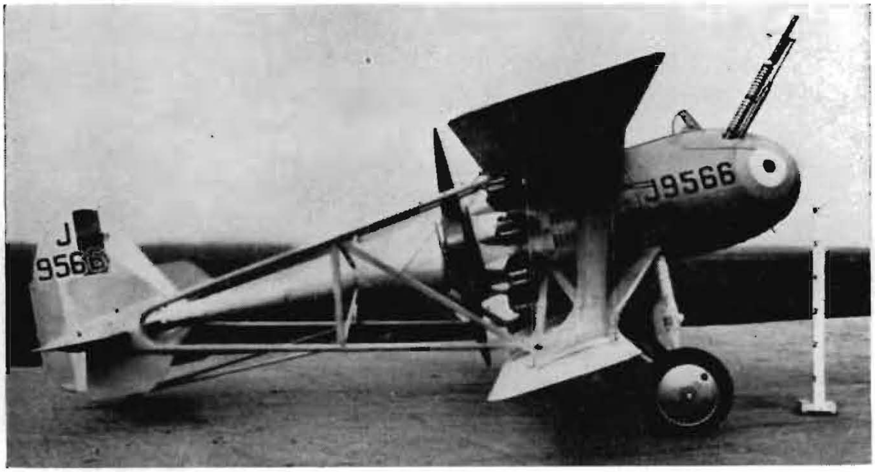
Full list of aircraft on order for the new Luftwaffe is: 380 F-100D, 226 Fiat F-86K, 68 Sea Hawk (for Navy), 137 Noratlas, 33 Pembroke, 265 Piaggio P-149, 383 Fouga Magister, 16 Gannet (Navy), 83 Bristol 171, 11 Skeeter, 26 Sikorsky S58, 26 Vertol H21, 14 Bell 47G, 14 Hiller 12C, 6 Djinn, 428 Dornier Do 27, and 5 Grumman Albatross. Out of a total of 2,121 aircraft, 800 will be made in Germany, some under licence, and 500 in Italy.



NORD 1405 GERFAUT II. Essentially a research delta the single-seat Nord 1405 Gerfaut II (Gerfalcon or Northern Falcon) has much in common with the Nord 1500 Griffon which was described in the April issue of *Air Pictorial*. They are complementary to one another, being designed to perfect the "one-shot" bomber interception theme. As evidence of the attempt to "get upstairs" quickly a recent unconfirmed report states that the Gerfaut II prototype reached 36,500 ft. from a standing start in 3 min. 2 sec. Designed by Jean Galtier, the Nord 1405 Gerfaut II is the progressive development of the Nord-SFECMAS 1402A Gerfaut 1A which flew for the first time on 15th January 1954. The Gerfaut IA became the first European jet aircraft to exceed Mach 1.0 in level flight on 3rd August of the same year. In its current form the Gerfaut II has been developed from the Nord 1402B Gerfaut IB. The present external shape differs particularly in respect of the wing plan form and the tailplane; the former having blunt tips, and the latter likewise but with the leading edge now extending to the fin leading edge. Also noticeable are the reheat vanes extending beyond the tail cone.



DASSAULT ETENDARD IV. Lightweight tactical fighter-bombers and "one-shot" bomber interceptors are growing in profusion and importance and to Avions Marcel Dassault goes the distinction of leading the field with half-a-dozen swept-wing and delta variations on a lightweight theme. In each case the fore part of the fuselage is basically the same. There are three deltas, the M.D.550-01, -02 and -03 or Mirage I, II and III (formerly called the Mystère-Delta) and three swept-wing versions formerly called the Mystère XXII, XXIV and XXVI now renamed Etendard II, IV and VI. Each variant differs in powerplant and/or basic role. The latest of the French lightweights to take to the air is the Etendard IV which is described as an interceptor and/or ground support fighter/bomber. The first of three prototypes, Etendard IV had its initial test flight at Melun-Villaroche on 24th July. The day previously the first Etendard II (side-by-side 2,425-lb. s.t. Turboméca Gazibo turbojets) was test flown. Three prototypes each of the II (for French air force evaluation) and the yet-to-be-completed VI (N.A.T.O. trials) will be built. The VI will have two 4,250 Bristol Orpheus B.Or.2 turbojets.



Vickers F.29/27 (serial J9566) complete with military markings, serial and C.O.W. quick-firing gun in position. This version differs from the one published on page 274 of the August issue in having small fins fitted to the top and undersides of the outrigger booms. This modified design is believed to have been designated Type 162.

The Journal of a Roving Spotter

THE ability to identify aeroplanes with split-second accuracy may well have become a matter of life and death for readers of this column in the Middle East. At the time of writing these words, the Anglo-French police action in the Suez Canal zone has gone according to plan and with little opposition from the Egyptian Air Force.

The air effort in support of the British and French landings in Suez, on the other hand, has been extensive. I am interested to see the reappearance, on the aircraft involved in this action, of black-and-white markings round the fuselage and wings. These markings resemble the well-known "invasion stripes" adopted by Allied aircraft in 1944 for the D-Day landings in Europe.

Full details of this air action to date are obscure, but a considerable variety of aircraft types appear to have been in action. At the upper end of the scale, Valiants were in action for the first time, flying from Malta in the preliminary "softening-up" attacks on Egyptian airfields. They were supported by Canberra bombers and photo-reconnaissance aircraft from Malta and Cyprus, and Hunters and Venoms from Cyprus (the Hunters being on detachment from Fighter Command bases in Britain). None of the squadrons involved has been officially named, but photographs have identified Nos. 1 and 34 Squadron Hunter 5s in the Middle East, and published references to squadron commanders involved identify No. 138 Valiant Squadron and Nos. 9, 10, 27 and 139 Canberra squadrons. Venom F.B.4 squadrons in the Middle East which are probably involved include Nos. 32 and 249. Some of the Venom squadrons in the Middle East are, incidentally, scheduled soon to receive Canberra B(I).8 interdictors.

In addition to these R.A.F. types involved, the Royal Navy has contributed Sea Hawks and Wyverns, and Gannets are also presumably available. French fighter support has included Thunderstreaks and Mystères of the Armée de l'Air, and Avengers and Corsairs of the French Navy have also been involved.

For the airborne landings, Hastings and Valettas were used by Transport Command and Noratlas by the French contingent. Whirlwinds were subsequently used to take Commandos into Port Said. Beverleys have been in the area since the Suez crisis first arose, but were reserved for flying in heavy supplies after the bridgeheads had been established.

Considerable confusion might have been caused, had the Egyptian and Israeli Air Forces been more active, by the fact that both these air forces fly British and French equipment. Egypt's front-line units were, of course, Soviet-equipped with MiG-15 fighters and Il-28 bombers, but batches of Meteor day and night fighters and Vampires had been purchased in the past. Israel also has some Meteors as well as a small number of Mystères and a larger batch of Ouragans. Older Israel equipment comprises Mosquitoes and Mustangs. For transport duties, Israel has some Noratlas transports (often seen at Blackbushe), and Egypt has ten Il-14s presented by Russia, while both nations use the Dakota and a miscellany of older types.

* * *

The Middle East situation focuses attention on the air forces of the other Arab states, and my illustrations of two types in service with the Royal Jordanian Air Force are of special interest therefore. These show a Vampire F.B.9 fighter-bomber and an M.K.E.K.4 Ugur trainer. The Vampire is one of ten which Jordan received as a gift from Britain earlier in the year; seven more Vampires were recently presented by Egypt.

The Ugur, now little used and seen here minus outer wing panels, was derived at the Turkish State Aircraft Factory from the Miles Magister, for which Turkey had a licence. The fin and rudder shape betrays this origin, but the enclosed cabin and "bent-knee" undercarriage (reminiscent of the Fokker Instructor) are new features.

Other equipment used by the R.J.A.F. includes Harvards which originally served with No. 1340 Flight, R.A.F., in the attacks on the Mau Mau in Kenya, Chipmunks, and three Gomhuriah trainers—Egyptian-built versions of the Bücker Bestmann.

Some light is thrown on R.J.A.F. serial practice by recent photographs. Fighters use the prefix F, and trainers T. The three-digit numbers which follow appear to include an indication of the aircraft type in the first position, followed by the series number. Thus, the Vampire illustrated, F-608, is the eighth of the type in service, with the "6" indicating Vampire.

Transports used by this air force are various and have different distinguishing letters according to the manufacturer—such as D for de Havilland (Doves) and VK for Vickers (VK500 Viking, and VK501 Varsity).

* * *

Following my note in the May issue that only three Yorks remained in service with the R.A.F., I have received an interesting letter from Singapore enclosing pictures of MW295, the personal transport of the C.-in-C., Far East Air Force. This particular York is named Ascalon II and, as the photograph shows, has a wide royal blue flash extending along the fuselage. The upper surfaces of the fuselage are white, the underside being polished aluminium.

* * *

Since my last column was written, news has been given officially to confirm the rumoured development of two new British civil aircraft of widely different types.

The larger of the two, the D.H.118, will be a four-Conway long-range medium-size transport, comparable with, but apparently more advanced than, the Boeing 707 and Douglas DC-8. Apart from the major significance of the development of this type to the British aircraft industry and to B.O.A.C., the announcement is of interest also in being the first new de Havilland type number revealed for seven years.

The previous "highest" was D.H.115, the Vampire Trainer. I understand the two intervening numbers, 116 and 117, refer respectively to a naval fighter and a land-based fighter of advanced design, work on which is not at present proceeding. This paucity of designations in the past seven years suggests that type numbers are now given only to types which progress beyond the initial project stage, since it seems unlikely that a design organisation the size of de Havilland's would study only three types of aircraft in the period.

(Continued overleaf)

Roving Spotter *(Contd.)*

Turkish-built Ugur trainer in Royal Jordanian Air Force markings.

The second new type also marks the re-emergence of a company into active design work after a lengthy pause. This is the Armstrong Whitworth A.W.65 freighter/coach, prototypes of which are to be built as a private venture by the company. Two versions have been announced, known as the A.W.650 and A.W.651, in what seems to be a new company system for designating variants.

The last Armstrong Whitworth design generally known was the A.W.55 Apollo (see page 436 for photograph), two prototypes of which were built shortly after the war. Since then, much work has been done on the Meteor night fighter, on Sea Hawk modifications, on guided missiles, and special projects such as the prone-pilot Meteor and guided-weapon-equipped Javelin. Among later design studies by the company of which I have note were the A.W.56, a four-jet all-wing bomber; the A.W.57, a high-wing civil jet transport to meet the M.R.E. requirement; and the A.W.58, a piloted transonic research monoplane of advanced design, construction of which was abandoned.

* * *

Coincident with the delivery of B.O.A.C.'s first Douglas DC-7C comes information to fill one of the persistent gaps in the British Civil Register. The batch G-AOIA to 'IJ is now seen to be allocated to the DC-7Cs, all of which should be in B.O.A.C.'s hands by March or April.

The registration of this batch follows what has now become normal Corporation practice to have one straight sequence of registration letters, commencing with "A", for each type in service. The procedure was adopted for the ill-fated Comet 2s, which were to have run from G-AMXA onwards, and has been followed with the Britannias. In the latter case, reallocation of the B.O.A.C. contract for Britannia types has led to some adjusting of these registration batches.

The fifteen Series 100s run from G-ANBA as always intended. When ten Series 300 were originally ordered, G-ANCA to 'CJ were reserved for this batch; 'CI and 'CJ were subsequently re-allocated to a Heron and a Dove respectively when the order for 300s was reduced to eight. At the time this order was reduced, ten Series 310 were ordered, and the registration batch G-AOFA to 'FJ was reserved. Subsequently, G-AOIK to 'IM appear to have been reserved for Britannia 310s also.

A further alteration to the contract allotted the first Series 300 to the Ministry of Supply as a prototype (leaving B.O.A.C. with G-ANCB and 'CC, Type 302s, and G-ANCO to 'CH, Type 305s) and increased the number of 310s on order to eleven. Since the registration G-AOFK had by this time been used, B.O.A.C. requested that its entire batch of 310s be re-registered, to keep them in a single sequence. This has now been done, the series commencing at G-AOVA. My guess is that the reservation extends at least to G-AOVR, since the B.O.A.C. order for 310s will be increased if the Series 300 aircraft are sold to North-east Airlines, as seems possible.

* * *

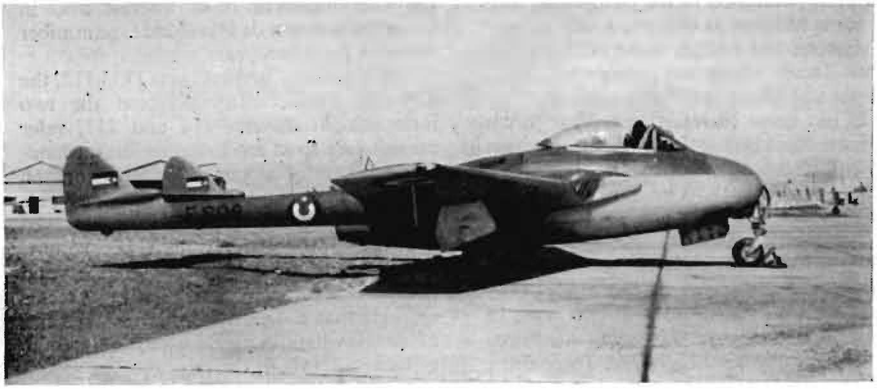
I wrote last month of drop-tanks on aircraft. Another fascinating subject for study within the overall framework of aircraft development is that of airborne armament. It is a subject far too extensive to discuss in the few inches which remain to me this month, but I think readers may like to see the rare view published here of the Vickers F.29/27 fighter with the 37-mm. Coventry Ordnance Works cannon in position. (Other details of this machine appeared on page 274, *Air Pictorial* for August.)

The earliest airborne installation of the big C.O.W. gun was, I believe, in a D.H.4 modified at the Isle of Grain experimental establishment towards the end of World War I. The gun was mounted so as to fire upwards in anti-Zeppelin sorties, and this thought seems to have been still uppermost when the F.29/27 specification was framed. Both the Vickers machine and the Westland monoplane built in competition with it, J9565, had the gun fixed to fire upwards as shown. Other installations of this gun were in the bows of a Blackburn Perth flying-boat, and in the Westland Westbury and Bristol Bagshot three-seat twin-engined fighters. The Westbury (J7765 and '66) and the Bagshot (J7767) had two of these guns each, but I have yet to see a photograph of the Westbury with the armament fitted. Any reader who was able to produce one would be rendering a service to aviation history.

* * *

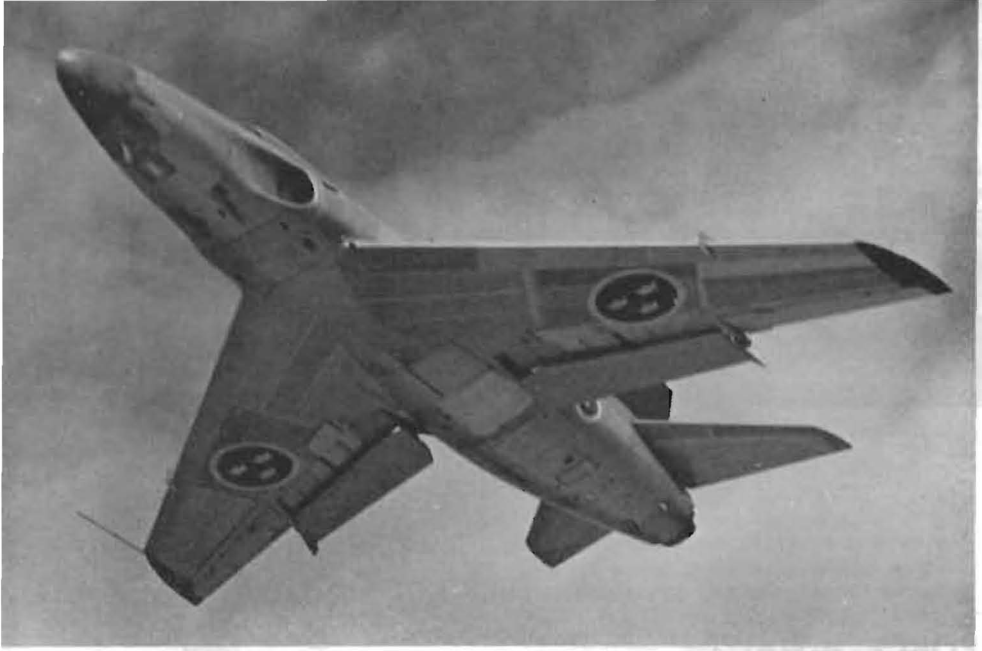
I referred briefly last month to Tiger Moth XL714 in service with the Royal Navy, and a photograph of XL715 appeared on page 396 of the same issue. There are, in fact, four of these Tigers, all ex-R.A.F., and with intermediate civil registrations which have not been taken up. They are XL714 (G-AOGR), XL715 (T6373, G-AOIK), XL716 (DE395, G-AOIL), and XL717 (G-AOXG). Other serial news is that Heron G-AMTS joined the Queen's Flight for the period of Princess Margaret's tour of East Africa, and was numbered XL961.

"Aeroscribe", *November* 1956

One of the ten Vampire 9s presented by Britain to the Royal Jordanian Air Force.


PETER TWISS HONOURED

THE Derry and Richards Memorial Medal, awarded each year by the Guild of Air Pilots and Air Navigators for experimental flying, has been presented for the year 1955 to Mr. Peter Twiss of Fairey Aviation Ltd. for his work on high-speed delta aircraft leading up to the World Air Speed Record runs. The Derry and Richards Memorial Medal is sponsored by the employees of the de Havilland Aircraft Company, and is awarded by the Guild annually to a pilot not on active service in the regular forces but professionally engaged in flying for testing or development of British aircraft.



Fowler flaps and deflector plates inboard of the belly shell and link chutes are well shown in the view above. *Below*: A Lansen of F17 in full warpaint and a factory line-up of production aircraft. The olive-green tail and wingtips are to improve between-planes observation in poor visibility.

Sweden's "Lance"

By Roy Cross

IN a recent Royal Aeronautical Society lecture Air Commodore Banks placed Sweden ahead of this country in quality of air force equipment. Doubtless he had in mind the Draken and Lansen fighters built by SAAB, and particularly the comparatively short development span for the Lansen of just under four years between the prototype's first flight and the machine's entry into service. It will be remembered, too, that SAAB's earlier J 29 was the first West European swept-wing fighter to reach the squadrons.

Such results are achieved mainly by concentrating the bulk of Sweden's limited technical and economic resources on bringing one main military type into production every three to four years. Only a small proportion of the closely integrated aircraft research potential is spared for long-term basic study, the main work being concentrated on Sweden's immediate future requirements in air defence.

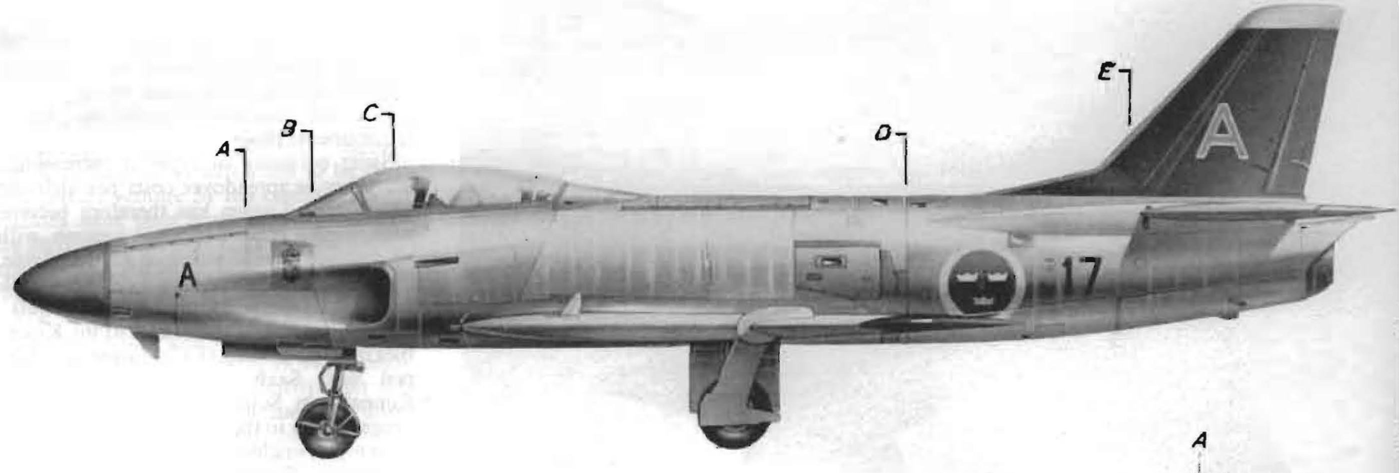
Strict economy of types is increasingly necessary as spreadover costs per airframe go up. The Lansen has therefore become very much a general-purpose weapon, with all-weather ground attack as its initial role, but being adaptable eventually as an all-weather fighter or reconnaissance aircraft.

Lansen deliveries went first to the Kungl. Blekinge Flygflottilj (F17), formerly equipped with Saab B18Bs and T18Bs, at Ronneby in Southern Sweden, and now progressively to the other three attack wings to replace single-seat Saab A29s and A28 Vampires. Re-equipment of squadrons, which should be completed by 1958, will be accompanied by an increase from twelve to sixteen planes per unit.

Technical Features

The Lansen is a straightforward swept-wing design based on a single high-powered axial flow jet engine, carrying a crew of two in tandem and designed to attain its

(*Continued overleaf*)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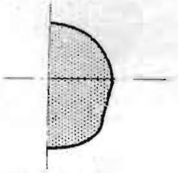
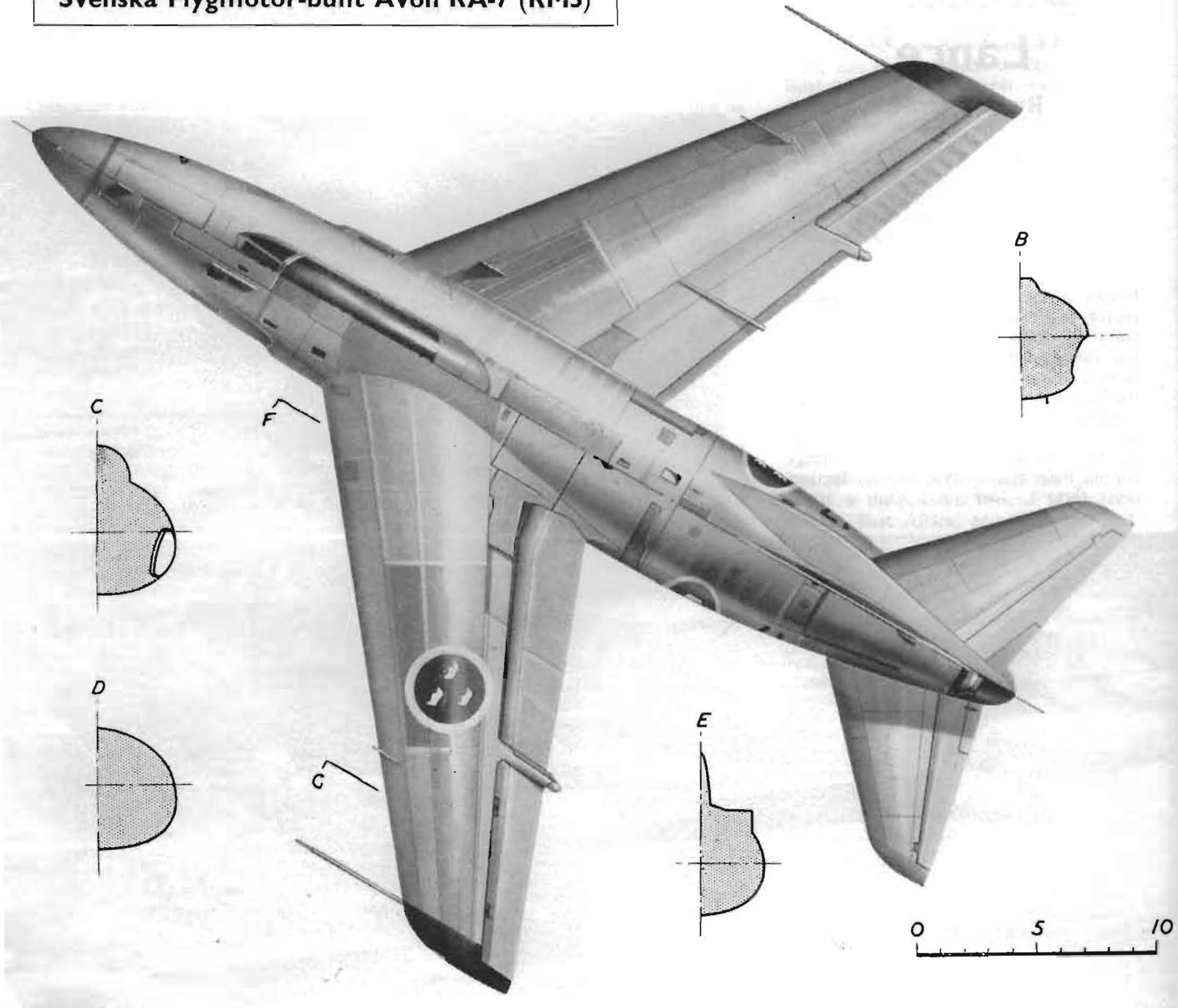


SAAB-32 LANSEN (AIR FORCE A-32A)
Svenska Flygmotor-built Avon RA-7 (RM5)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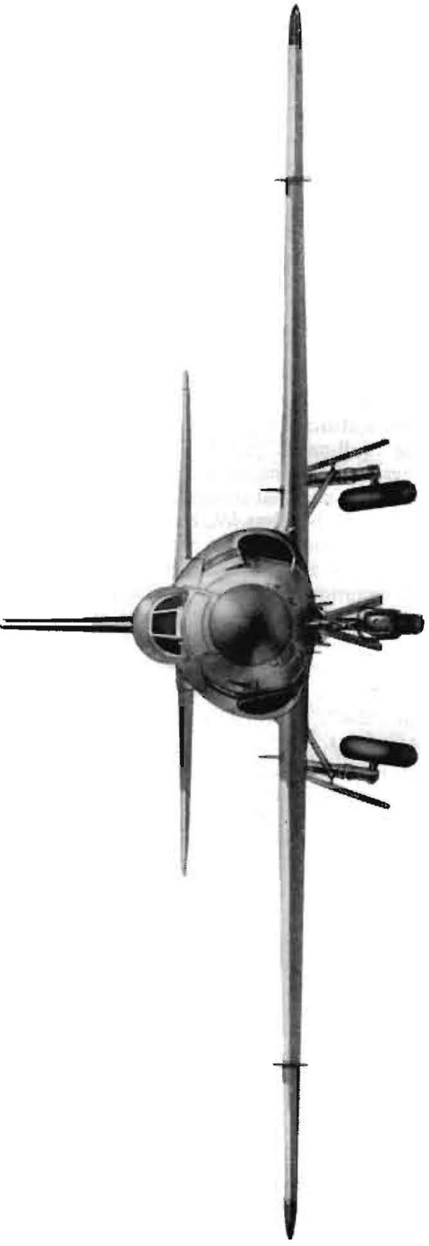

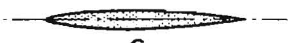

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LANSEN DETAILS

Span 42 ft. 8 in.; length 48 ft.; height 15 ft. 6 in.; aspect ratio 4.5; empty weight approximately 15,500 lb.; normal loaded weight approximately 22,000 lb.; maximum speed about 750 m.p.h.; landing speed 125 m.p.h.; service ceiling over 50,000 ft. Engine Svenska-Flygmotor RM5 (Avon) giving approximately 9,500 lb. s.t. with afterburning.

Colour Scheme

Natural metal finish (unpolished); vertical tail and wingtips olive green; fin tip white plastic; plane letter outlined in white on fin—letter coloured red, blue or yellow according to squadron in wing; letter repeated on nose, and nose radome tinted, in squadron colour; wing number in black aft of national insignia; squadron badge on forward fuselage side. National insignia on production machines will appear on the wing undersurfaces and fuselage sides only.

near-750 m.p.h. performance without running into compressibility troubles—it will easily exceed Mach 1.0 in a dive.

The cleanest possible nose entry and provision of a large radome precluded a nose intake duct, and from the various alternatives was chosen a neat arrangement of partly submerged fuselage side intakes which contribute to the inverted-heart fuselage cross-section. The pressurised, refrigerated cockpit is sunk between the divided ducts to give a low top-decking line and a beautifully slim side elevation. Both crew-members have lightweight SAAB ejection seats beneath a one-piece side-folding jettisonable canopy. A dual control familiarisation trainer is planned.

The dumpy fuselage section maintained aft of the cockpit indicates capacious fuel stowage, although due to the air ducting there are a number of irregular-shaped tanks grouped in the side and top decking.

Because of the faintly flat-bottomed shape of the fuselage hereabouts the thin, low wing joins almost at right angles except at the carefully faired leading edge. Just behind the wing trailing edge four segments of the fuselage side and bottom swing out sideways into the airstream to act as air brakes, and immediately aft of these again is a very heavy frame from which the entire rear fuselage shell may be detached to ease engine removal and maintenance.

Engine

Built out rearwards from this frame are the massive main engine mounts. Power unit is a Svenska Flygmotor-built version of the afterburning Rolls-Royce Avon RA.7R (Swedish designation RM5). Output is not disclosed, but should approximate to the 9,500 lb. s.t. with afterburning of its British counterpart.

The swept tailplane is high-placed well clear of the wing wake; to avoid an awkward join to the top of the tail pipe and provide a suitable surface for tail movement it is mounted on large tapered fairings which smooth the airflow at this point. Tailplane incidence is adjustable electrically, but there are separate power-boosted elevators each with a trim tab. A swept fin and rudder placed slightly forward of the movable tailplane, and a tail fairing extended over the cut-back jet tail pipe, complete the fuselage lines.

Offered up to the fuselage as a complete unit, the wing has its maximum thickness well aft of the leading edge and is swept back 35 degrees at the quarter chord line. Large Fowler flaps are arranged to move rearwards to the trailing edge before being lowered. Automatic leading edge slats provided on the first prototype proved to be unnecessary and were replaced by small fences. Small triangular fins—probably aerials—are carried near each wing root leading edge.

Sturdy wing-mounted mainwheel units retract inboard into the wing centre-section. The nosewheel assembly with dual landing lights retracts forward into a nose compartment, above and to either side of which are the radio-radar gear and cannon armament.

Military equipment includes full all-weather target-finding radar and night-flying gear, four 20-mm. cannon, and provision for wing-mounted rockets, a belly long-range fuel tank, guided missiles, and bombs, including tactical atomic weapons.

Development

Discussions between the Royal Swedish Air Board and SAAB on the project which ultimately became the Lansen began in the autumn of 1946. Looking ahead, the best replacement for the piston-engined Saab-18Bs then entering service with the Royal Swedish Air Force seemed to be a twin-Ghost aircraft, two engines being deemed a necessary safety factor to offset the then unproven reliability of jets and to give adequate performance in view of the range and equipment requirements.

SAAB investigated the flying wing formula until 1947, when discouraging results from similar designs abroad prompted them to fit a tail boom, and finally to drop this layout altogether.

Further thoughts involved a tail-first layout, a design with wingtip-mounted jets, and the slightly swept Type 1119, rather like a bulbous Northrop Scorpion. Finally, the Lansen—then called Type 1150—built around a single powerful jet was submitted.

On 20th December 1948 SAAB got an order for Phase 1 project work and mockup construction. Aerodynamic testing, begun in 1948, was helped along by the Aeronautical Research Institute (FFA) which investigated two separate swept wings. One of these was fitted to a Safir (which thus became the Saab-202) to try out stalling characteristics and slot and flap arrangements.

Four prototypes, the first of which made its 45-minute maiden flight on 3rd November 1952, were used to hurry the machine through its development testing. Quantity production was ordered in 1953 and production deliveries began in late 1955.

New Books

Many books are published at Christmastide, for they make very suitable gifts, especially in this country which has the largest book-reading public in the world. *Air Pictorial* takes pleasure in giving below brief descriptions of some of the new and important aviation and aeronautical books available at this time.

'Test Flight", *by Wing-Comdr. H. P. (Sandy) Powell, A.F.C., A.F.R.Ae.S. Allan Wingate* 15*s*.).

AS the first book to be devoted to a complete exposition of the art and craft of the test pilot, this book is of the greatest interest, and also of technical value. The author takes the reader through the whole process of flying a new type, from the first flight of the prototype—and even before that stage—to the final "passing out". The kind of information which this book gives of the design and behaviour of aeroplanes, including the supersonic variety, and the art of test flying them, is essential to all who wish to acquire a serious background of aviation knowledge.

"My Fifty Years in Flying", *by Harry Harper* (*Associated Newspapers*, 12*s*. 6*d*.).

HARRY HARPER's fifty years began in 1906. His book, therefore, is a valuable source for those who have need from time to time to delve into aviation history. But its value for this purpose would be greatly enhanced by a proper index, including the names or types of the aircraft mentioned in the book, instead of one which consists entirely of names of people and places. But the book is first-rate reading for any aviation enthusiast.

"Rockets and Guided Missiles", *by John Humphries, B.Sc.* (*Hon.*), *A.M.I.Mech.E., A.F.R.Ae.S.* (*Ernest Benn*, 30*s*.).

THIS is a comprehensive survey of the subject as it stands today. It is sufficiently "technical" to be of value to the engineer, but by no means incomprehensible to the comparative layman. The clear and well-conceived diagrams and other illustrations are excellent. The subject is, of course, of fascinating interest, and the possessor of this book can feel that at least he knows as much about it as can be revealed.

"Wings over the Atlantic", *by Robert J. Hoare* (15*s*.). **"Great Moments in Flying",** *by John W. Taylor* (*Pheonix House Ltd.*, 7*s*. 6*d*.).

THESE two books recount oft-told tales in a form suitable for the quite young reader. As presents at Christmas-time they will give pleasure and a good many thrills to small boys, and will help to build up a keen interest in aviation.

"Aero Modeller Annual 1956-7" (*Aeronautical Press*, 10*s*.).

THE serious aero modeller cannot afford to be without this annual, now in its ninth year. It is to be hoped that its readers will heed the advice given in the introduction—not to be beguiled by the plastic kits which are coming in such large numbers into the markets, and which can be assembled in an hour or two. This is not aero modelling.

"Lonely Warrior", *The Journal of Jean Offenberg, edited by Victor Houart, Preface by Group-Captain Peter Townsend, D.S.O., D.F.C. and bar* (*Souvenir Press*, 18*s*., *illustrated*).

OFFENBERG was the first Belgian pilot to receive the D.F.C. and to lead a British fighter squadron in the Battle of Britain. He was killed in a tragic air crash in January 1942, but his diaries that he kept from 1940 until that time have only just come to light. Since they were written as the events actually occurred, we now have a poignant record of the feelings and of the lives of "The Few" written by a gallant ally deprived of his homeland. This book will appeal especially to the readers of *The Mouchotte Diaries.*

"Fly for Your Life", *The Story of "The Immortal Tuck", Wing-Commander Robert Stanford Tuck, D.S.O., D.F.C. and two bars, by Larry Forrester* (*Muller*, 18*s*., *illustrated*).

TOP of the Christmas tree must come this biography of one of the world's ace fighter pilots, which is written in a thrilling exciting manner, and is one of the best wartime air stories ever to be published. There are vivid descriptions of combat, of escape after capture through the snow, of life and death in the air and in the sea. There are also further views on "Rhubarbs" and tactics, and readers will be able to compare Tuck's views with those recently expressed by "Johnnie" Johnson and Douglas Bader on these important subjects.

"He 1000", *by Ernst Heinkel, edited by Jurgen Thorwald* (*Hutchinson*, 30*s*.).

A LONG and interesting autobiography, supported by over eighty photographs, of one of the leading German aircraft designers, responsible amongst other things for the first turbojet aircraft in the world to fly. A valuable history of air progress.

"Into the Silk", *by Ian Mackersey, Foreword by Neville Duke* (*Hale*, 16*s*., *illustrated*).

NOT the least remarkable of the contents of this book of epics of members of the "Caterpillar Club" are the illustrations; there are many of them, depicting jumps, ejections, and the people who made them to save lives or save their own lives. There are also a number of interesting facts, including mention of the jet Martin Baker M.B.6, and the note that more people jumped from Lancasters than any other aircraft. There are 40,000 members who wear the little golden silk-worm, and very many of their stories are included in this volume of tribute.

"Famous Fighters of the Second World War," *by William Green* (*Macdonald*, 18*s*.).

FAMOUS FIGHTERS could hardly have been published at a more opportune time—a time when interest in the warplanes employed during World War II is at its most profound. This lavishly produced book, whose author, William Green, has frequently contributed articles on wartime aircraft to *Air Pictorial*, tells in considerable detail the full stories of the most famous of wartime fighters, ranging from the Spitfire, Hurricane and other British machines, and their American contemporaries, such as the Mustang and Thunderbolt, to their Japanese and German opponents, the Zero-Sen, the Shiden, the Bf 109, the Fw 190, and many others. The author has obviously placed considerable emphasis on accuracy and has not allowed his approach to his subject to be clouded by the numerous errors of fact perpetrated during the war years and perpetuated since. In fact, many long-standing fallacies have been exposed for the first time. The book contains several hundred extremely rare and interesting photographs, numerous line drawings which offer ready comparison between variants, but, perhaps the finest feature of the book is the series of brilliant full-page general arrangement drawings in full tone, resplendent in wartime finishes, national insignias and squadron markings, by Gert W. Heumann, who was also responsible for the highly dramatic jacket. This is a book that can be unhesitatingly recommended for all who wish to be "clued up" on the *true* facts of wartime fighters, and its publishers have rarely offered better value for money.

"Crash Pilot", *by Dick Grace* (*Longmans Green*, 16*s*.).

THIRTY years a pilot, the author of this unusual tale is one of the leading "stunt pilots" today. An American, he writes in the style of that country of his "dices with death" when deliberately crashing aircraft into aircraft or aircraft into the ground for circuses and films. Many will have seen the spectacular crashes in such films as "Hell's Angels" and "Dawn Patrol". Grace was the pilot, and describes the scientific measures necessary to prevent pilots going up in flames on their mounts.

"The Brabazon Story", *by Lord Brabazon of Tara, G.B.E., M.C., P.C.* (*Heinemann*, 25*s*.).

A LIVELY and humorous selection from the great range of experiences that have enriched the life of the man who holds Royal Aero Club Pilot Certificate No. 1, with illustrations ranging from Short's Biplane No. 2 to the Cresta Run.

"War in the Air", *by Gerald Bowman, Foreword by Sir Philip Joubert* (*Evans*, 16*s*.).

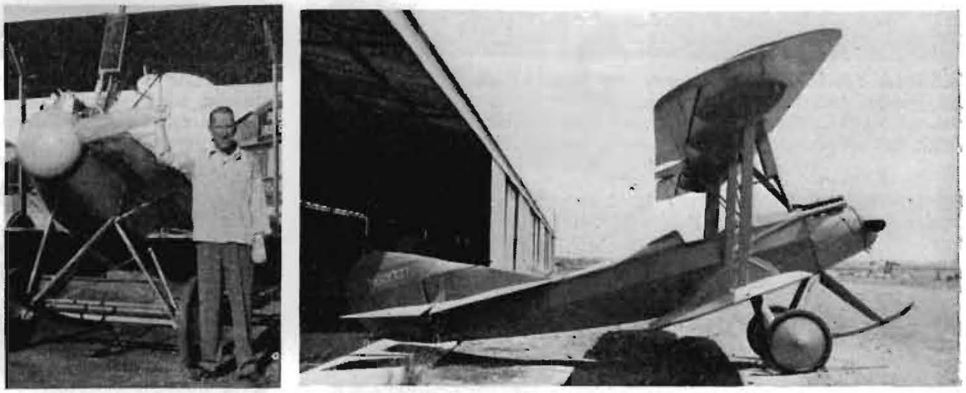
THE book version of the B.B.C. television series of the same name, complete with illustrations and appendices giving specifications of aircraft that took part in both world wars, which forms a useful historical record.

Aircraft Engineering Corporation Ace (1919)

THIRTY-FIVE YEARS is a long time between flights—yet this is exactly what happened in the case of the single-seat Ace, of which eight were built during 1919–20.

According to the rebuilder, Mr. Lowery, this sole surviving Ace was last flown on 20th January 1920 before it went into storage for more than three decades.

The spruce wood and linen fabric-covered Ace has two associations with the United Kingdom. According to a contemporary report ("*Text Book of Applied Aeronautic Engineering*", by *Henry Woodhouse*; *New York Century Company*, 1920), the chief test pilot of the Aircraft Engineering Corpn. was an ex-R.A.F. instructor, Bruce Eytinge. And in order to get the Ace into the air again on 27th July 1955, Mr. Lowery, after scouring the U.S.A., eventually had to turn to England in order to obtain the necessary 26 in. × 3 in. tyres. Dunlop was the supplier.



Standing in front of the 1919 single-seat Ace is Mr. Lorrill L. Lowery of 127 Leese Street, San Francisco 10, California. Mr. Lorrill painstakingly rebuilt the Ace (N69097-Restricted) in three years and test flew it for the first time on 27th July 1955. In order to rebuild other antique (vintage) aircraft, Mr. Lowery plans to devote all the money which will become available when the Ace finds a suitable purchaser. (*Photos: Lowery/Chalmers H. Johnson.*)

The Ace was designed round the 40-h.p. Ace water-cooled four-cylinder inline (which incorporates many Ford Model T/A/B automobile engine parts and accessories) driving a 6-ft. propeller.

With a strength (safety) factor of 8, the Ace is fully aerobatic, and because of the inherent stability of the design it will recover from any attitude without recourse to pilot control. In fact, the Ace may be described as the American post-World War I pioneer sports plane. The 1919 advertisements proclaimed the Ace to be "America's premier" plane—selling at $2,500. Other roles listed included: light express and air mail carrier, aerial advertising, exhibition work and policing duties.

Such was the high-grade material used and the first-rate labour employed that after thirty-two years of storage Mr. Lowery found it necessary to renew only the aileron and wingtips and to re-cover the airframe. The dope finish is "solid sky blue".

Some idea of the excellent flying performance of the Ace may be gained from the following abbreviated description of Bruce Eytinge's first altitude tests.

Eytinge took off from the company's airfield at Central Park, L.I., N.Y., reaching 6,000 ft. in twenty minutes and 8,000 ft. eight minutes later with no loss of control. Flying level, power was retarded by 50 per cent, and even this did not materially affect horizontal flight. Then the engine r.p.m.s were reduced to idling and the Ace nosed into a shallow glide at about 25 m.p.h. (max. speed 65 m.p.h.). Without effort this glide from 8,000 ft. permitted a flat glide for twenty-two miles, followed by a sweeping turn and fourteen miles back to the airfield, landing "dead stick" with a 60 ft. run.

AIRCRAFT ENGINEERING CORPORATION ACE (1919)

New York, N.Y., U.S.A.

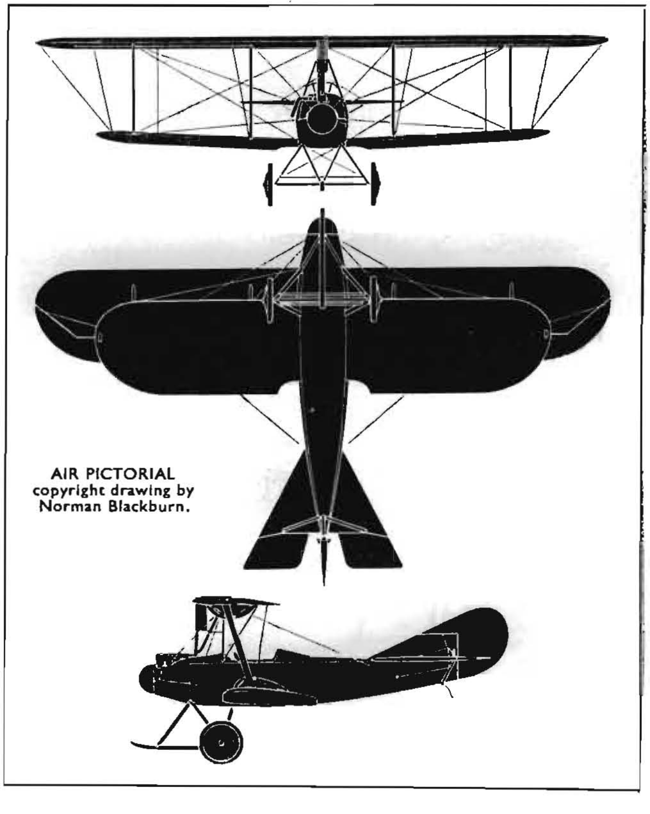
40-h.p. A.E.C. Ace water-cooled, 4-cyl. in-line. Direct drive at 2,000 r.p.m. Weight 126 lb.

Dimensions:

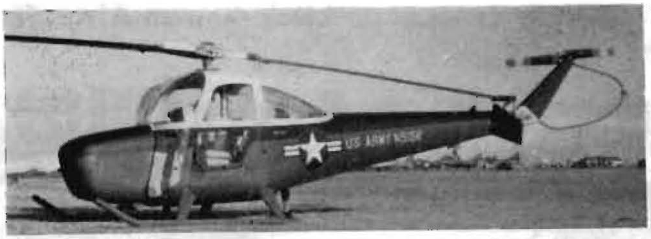
Span (upper) 28 ft. 4 in.; (lower) 22 ft.
Chord (upper and lower) 4 ft. 6 in. Aerofoil R.A.F. 15.
Length 18 ft. Height 7 ft. 6 in.
Main undercarriage track 5 ft. Main wheel diameter 26 in.
Dunlop 26 × 3 tyres, on wire (spokes) wheels.

Other data:

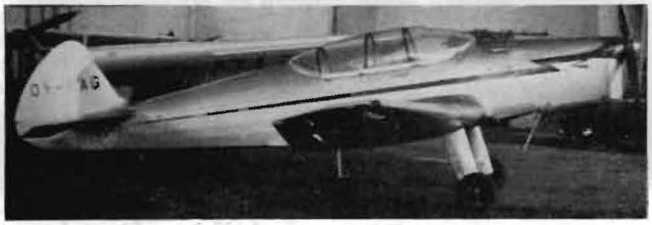
Fuel consumption 4 U.S. gall. per hour.
Fuel tankage 12 U.S. gall. Max. speed 65 m.p.h.



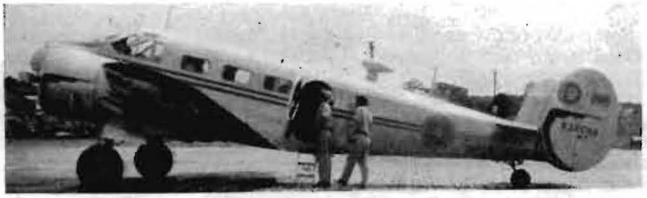
AIR PICTORIAL copyright drawing by Norman Blackburn.



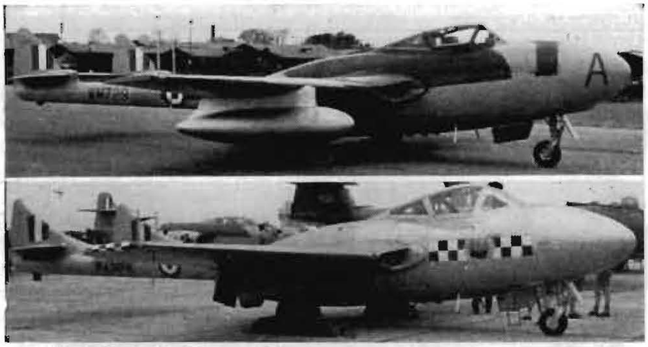
CESSNA YA-41-CE (temporarily registered N5156) is the newest U.S. Army Aviation two/four-seat A.O.P. currently undergoing evaluation trials. The YH-41 illustrated is actually the first prototype which was recorded in civilian guise in the September *Air Pictorial*. (*Photo: P. M. Bowers, Seattle, U.S.A.*)



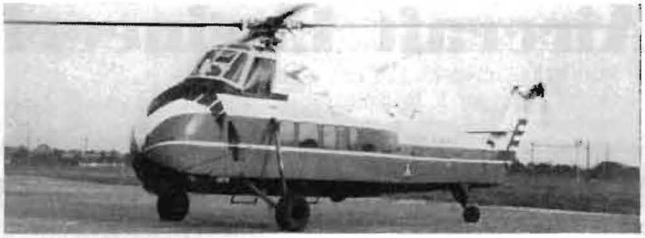
DANISH KZ-II-T (OY-FAG), a post-war development of the Kupe (Coupe—enclosed) and Sport tandem-seaters has larger rudder area and in this case a "local mod." canopy. Power is a 145-h.p. D.H. Gipsy Major 10. (*Photo: T. Herminghaus, W. Germany.*)



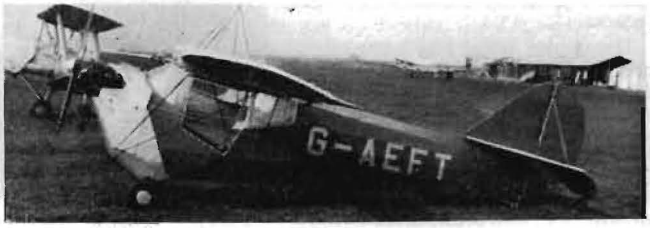
VIETNAMESE BEECH 18 photographed at Saigon bears the new orange (with three concentric red rings) military markings—plus U.S. civil registration N3458B.



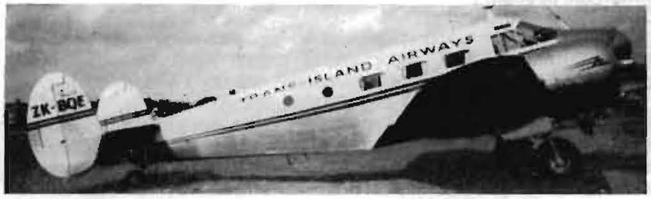
CHANGED-ROLE VAMPIRES. Compare nose and tail assembly differences on the (*Top*) A D.H.113 Vampire NF. Mk. 10 (WM729) two-seat night fighter now relegated to training duties. (*Bottom*) A D.H.115 Vampire T. Mk. 11 (WZ589) emblazoned with the red and white checkerboard markings of No. 56 (F) Squadron—equipped with Hunter F. Mk. 5s. (*Photo: A. J. Wright, Hoddesdon, Herts.*)



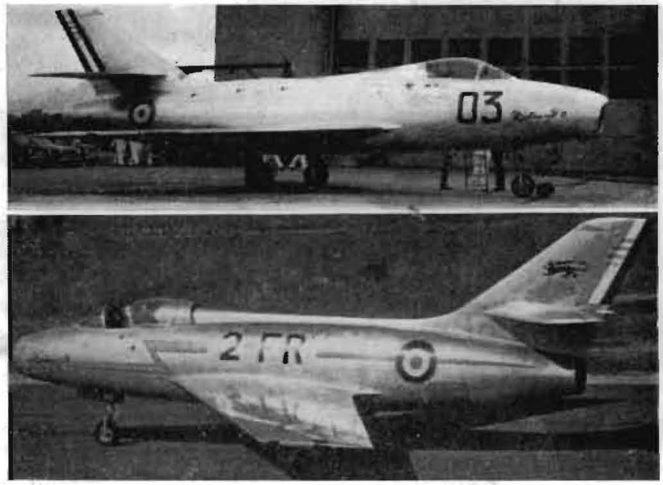
SKYBUS is the name given by New York Airways, Inc., to the newest additions to their pioneer, all-helicopter fleet—the first commercial Sikorsky S-58 twelve-seaters. Illustrated is N876 which is serving on the New York inter-airport shuttle flights every forty-five minutes.

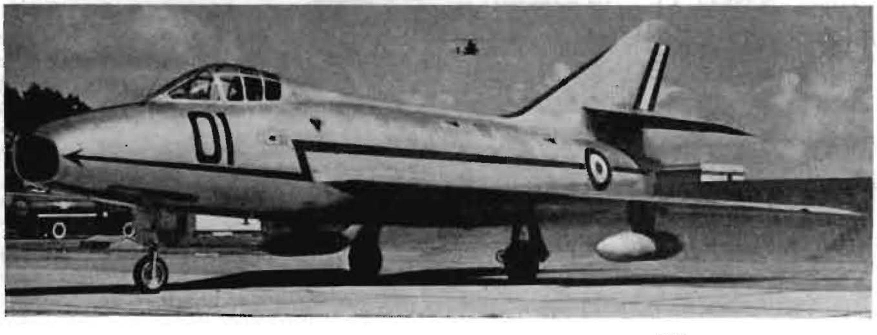


ONLY AERONCA C-3 still on the British Register, G-AEFT (c/n. A.610) is owned by H. Dodd of Newcastle. Built in 1937, this 36-h.p. Aeronca E.113C-powered two-seater is in perfect condition. (*Photo: A. R. Wilson, Newcastle-upon-Tyne.*)



IN TRANSIT KIWI (ZK-BQE; ex-N3010V) is a New Zealand-bound Beech D18S "Spirit of North Otago" seen at Croydon recently.





MYSTERES THREE

Backbone of France's defence interceptor strength is the Dassault Mystère. The Super Mystère B2 will be flying in early 1957 and will augment the fighter role with that of ground attack. Like the Super Mystère B1 (*left*), the B2 will be supersonic in level flight. The B1/2 stems from the Mystère IVB (*above, upper*) and will supplement and then replace the current production Mystère IVA (*above, lower*). The prototype Super Mystère B1 ("O1") first flew on 2nd March 1955. Now 30-mm. gun ports have been added under the nose, the canopy strut-strengthened and the tail cone cut back. Note underwing DEFA rocket containers.

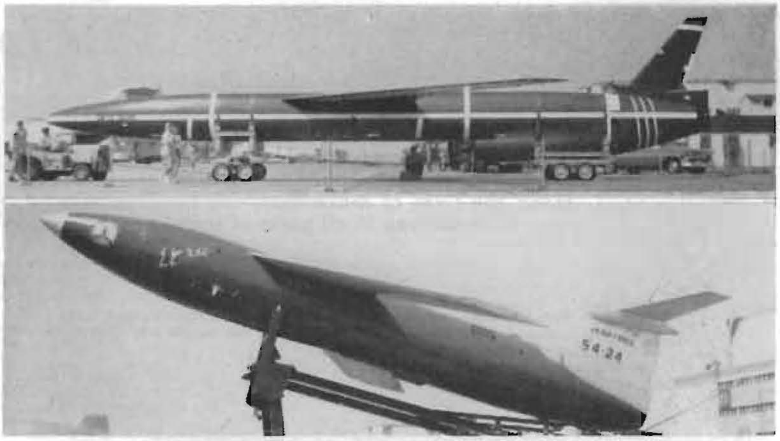
Air Pictorial's

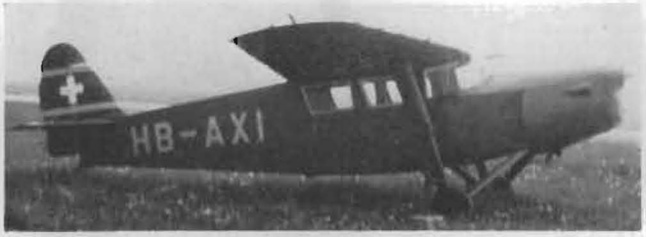
DECEMBER

PHOTO REVIEW

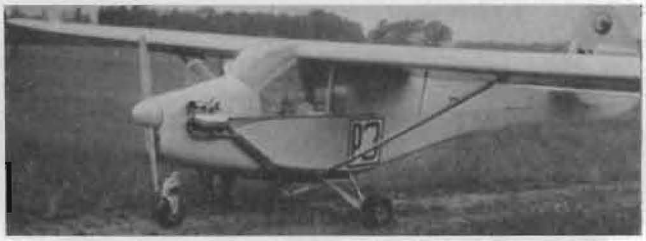
ONE MISSION BOMBERS (U.S.A.F.)

Heralds of the U.S.A.F. pilotless bomber era are (*right, upper*) the strategic, Mach 0.9 prototype Northrop XSM-62-NO Snark, and (*right, lower*) latest tactical Matador, the improved range and guidance system's TM-61C-MA. Both are Allison J33 turbojet-powered, but the production SM-62A-NO will have the P. & W. J57. (*Photos: P. M. Bowers, U.S.A.*)

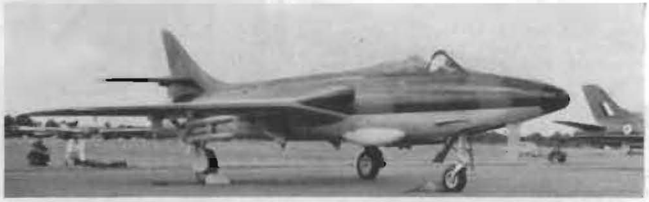




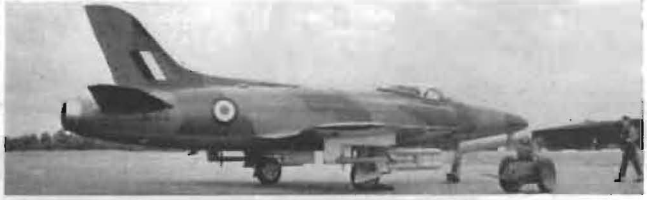
SWISS MOSKITO (HB-AXI) is the 1931-designed Comte A.C.12, a three-seater, powered either by radial Genet or as in this case by a 120-h.p. D.H. Gipsy III in-line. Four Moskitos are still registered in Switzerland. (*Photo: T. Herminghaus, W. Germany.*)



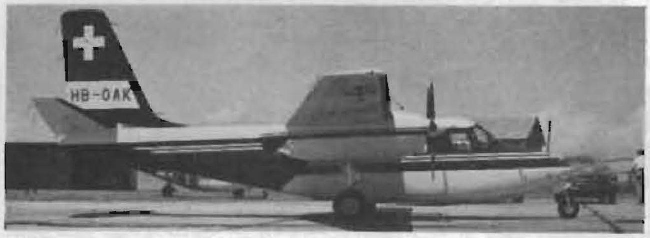
RAAB MORAA PROTOTYPE (D-EBAC) two seater has been considerably developed in the past year. A Porsche replaces the 30-h.p. Volkswagen engine, altering the nose outline. The rudder is deeper and the undercarriage strengthened. (*Photo: T. Herminghaus.*)



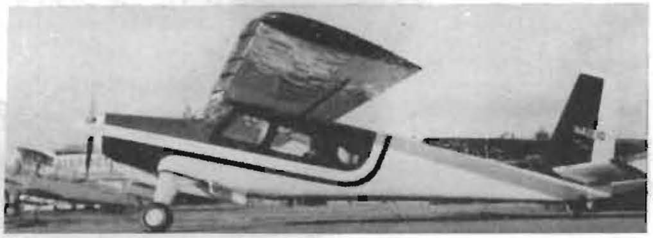
MISSILE CARRIER-I. Compare the close-set launching arm for the Fireflash guided missile on this Hunter Mk. 4 (XF310) with that on the Swift.



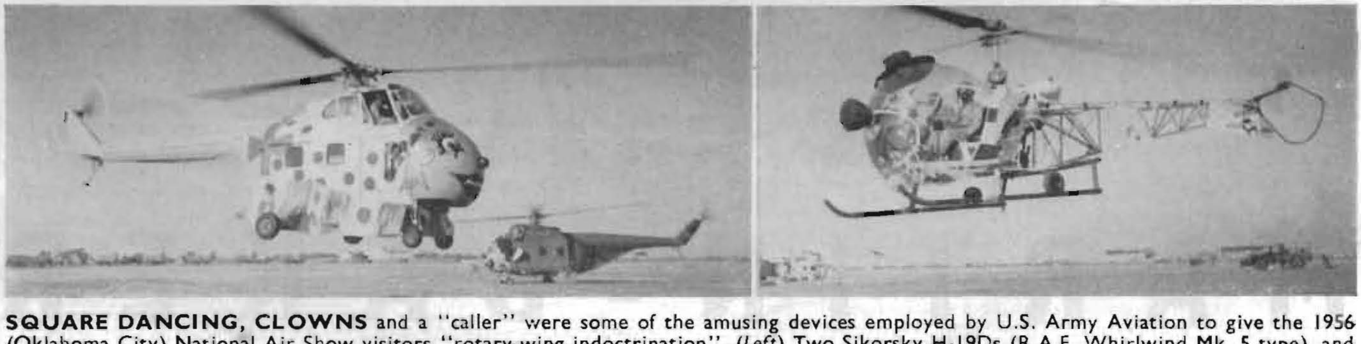
MISSILE CARRIER-II. Swift Mk. 7 (XF113) has a deep g.m. launching arm. Unlike "private venture" Hunter, the Swift has military markings.



FIRST EUROPEAN Aero Commander (HB-GAK) five/seven-seater was delivered to a Zürich publishing house in September.



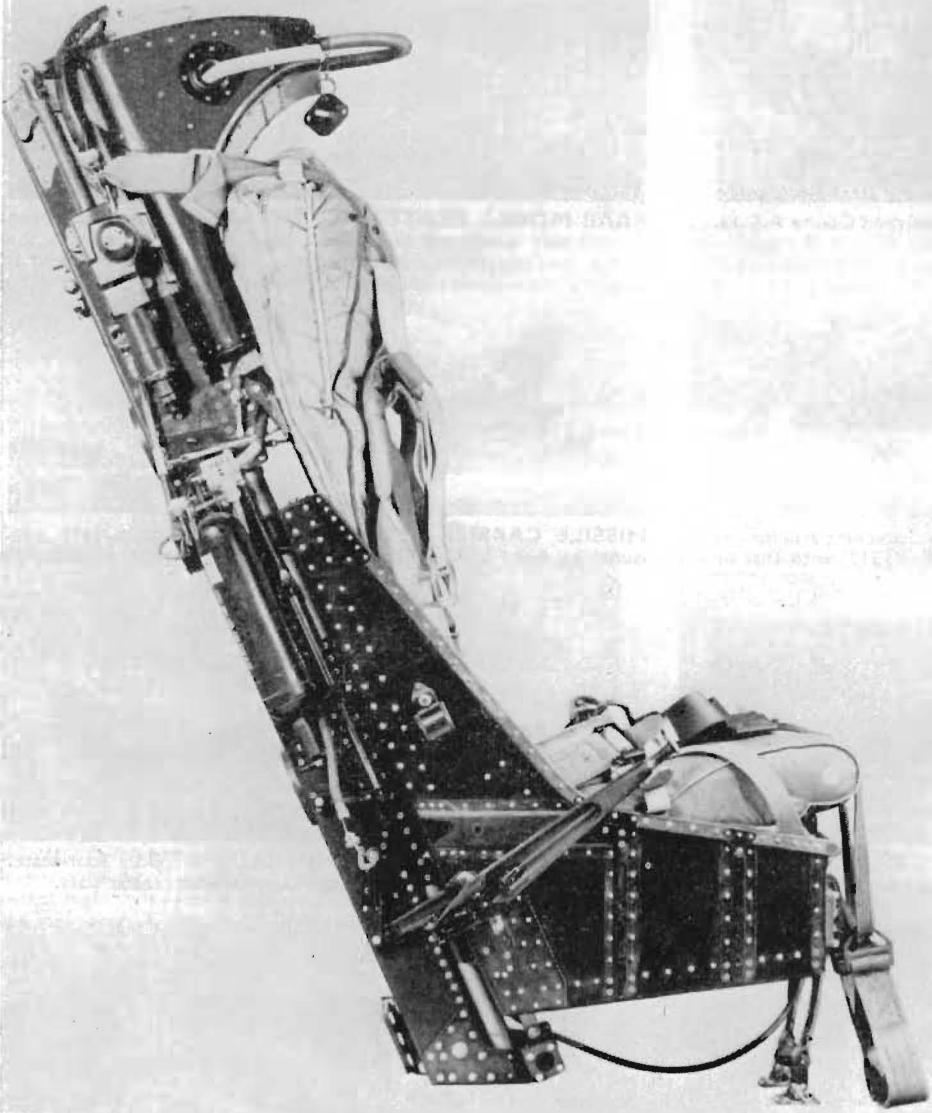
HELIO H-391 COURIER (N4101D), a S.T.O.L. four-seater utilises full-span Handley Page-Lachmann automatic slats.



SQUARE DANCING, CLOWNS and a "caller" were some of the amusing devices employed by U.S. Army Aviation to give the 1956 (Oklahoma City) National Air Show visitors "rotary-wing indoctrination". (*Left*) Two Sikorsky H-19Ds (R.A.F. Whirlwind Mk. 5 type), and (*right*) a Bell H-13E "clown". (*Photos: P. M. Bowers, U.S.A.*)

Martin-Baker Ejection Seats are in service with the air forces of twenty-six nations and have saved the lives of more than one hundred and forty airmen in all parts of the world.

The illustrations show a standard Mark 4 lightweight fully automatic ejection seat as used by the Royal Air Force.



MARTIN-BAKER

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British Military Aircraft Code Markings

(By R. C. Sturtivant)

Readers of "British Military Aircraft Code Markings", which appeared in *Air Pictorial* between January 1955 and February 1956, were invited to send any additional information they possessed to the author. Many readers kindly responded to this invitation, and the resulting list of additions is given below.

R.A.F. SQUADRON CODES, 1938-39

Squadron No.	
4	**FY** Delete code TV.
6	**ZD** (Hardy 1, Gauntlet 2). Delete Demon.
18	(Hind).
23	**MS** (Demon 1 (Turret)).
26	**HL** (Hector). Delete Lysander.
31	(Valentia 1).
36	**VU** (Vildebeeste 3).
148	**BS** (Anson 1, Wellington 1).
210	**VQ** Amend squadron number to 201.

R.A.F. SQUADRON CODES, 1939-45

2	**KO** (Lysander 1), **Nil** (Mustang F.1A). Delete Lysander 3.
4	**TV** (Lysander 1, 2, 3; Mustang F.1), **Nil** (Mosquito PR.16, FB.6; Typhoon F.1B). Delete code FY.
6	**JV** (Hardy; Gauntlet 2).
7	**MG** (Wellington B.1A).
8	Delete Maryland, Boston.
13	**OO** (Lysander 1, 2, 3, 3A; Blenheim 4L), **Nil** (Blenheim 5D; Boston B.3, B.4, B.5; Marauder B.3). Delete Tomahawk, Mustang.
14	Nil (Wellesley 2; Blenheim 4L; Boston B.3; Mustang F.1; Marauder B.1, B.2, B.3). Delete Blenheim 1L, Maryland, Ventura, Wellington GR.13, Mosquito.
15	Delete Lancaster B.7.
18	Nil (Blenheim 1L, 4L, 5D). Delete Wellington.
25	**ZK** (Beaufighter NF.1.Srs.2, NF.1.Srs.3; Mosquito NF.2 (Intruder), T.3, NF.17; Havoc NF.1). Delete Beaufighter NF.6F, Mosquito NF.13.
26	Unknown (Spitfire F.5; Mustang FB.4).
27	Nil (Mosquito FB.6).
28	Unknown (Hurricane FB.2B). Delete Hurricane F.2.
30	Delete Kittyhawk.
32	Delete Hurricane F.2A.
33	Unknown (Spitfire F.5C; Hurricane FB.2C). Delete Spitfire F.5.
34	Unknown (Hurricane F.2A, FB.2B). Delete Hurricane 2.
37	Unknown (Liberator B).
38	Delete Wellington B.10.
39	Delete Marauder B.1.
45	**OB** (Blenheim 1L, 4L).
47	Nil (Beaufighter TF.1C, TF.6C, TF.10, TF.11C; Blenheim 5D; Mosquito FB.6). Delete Baltimore.
48	Unknown (Beaufort 1).
51	**LK** (Halifax B.2.Srs.1A).
52	Delete Audax.
54	Unknown (Spitfire F.8).
55	Unknown (Baltimore B.5).
62	Unknown (Hudson GR.3).
64	**SH** (Spitfire F.9C). Delete Spitfire F.5C.
68	**WM** (Mosquito NF.13, NF.19). Delete Beaufighter NF.2F, Mosquito NF.12.
72	**RN** (Spitfire FB.9E). Delete Spitfire F.9.
81	**FL** (Spitfire F.9).
87	**LK** (Hurricane F.2A, F.2B).
88	**RH** (Mitchell B.3).
93	**HN** (Havoc 1 (Pandora); Spitfire F.5C). Delete Boston, Spitfire F.5B.
96	**ZJ** (Defiant NF.1A, NF.2; Hurricane NF.1, NF.2C; Beaufighter NF.2F; Mosquito NF.17). Delete Beaufighter NF.1F, Mosquito NF.12, NF.14, NF.19.
101	Delete Lancaster B.7.
108	Unknown (Blenheim 1L). Delete Maryland, Boston.
109	Delete Hampden, Lancaster.
112	Delete Hurricane, Vincent.
114	**RT** (Blenheim B.5D; Boston B.3, B.4, B.5).
117	Nil (Hudson C.6; Lodestar C.1, C.2; DC-2; Dakota C.3, C.4).
118	**NK** (Spitfire HF.6, F.9C). Delete Spitfire F.9.
121	**AV** (Hurricane F.2B).
122	**MT** (Spitfire F.2A, LF.5B, F.9B, LF.16E). Delete Spitfire F.5A.
123	Unknown (Hurricane).
124	**ON** (Spitfire F.5B).
125	**VA** (Mosquito T.3, NF.17). Delete Mosquito NF.12, NF.13.
126	Nil (Hurricane F.2B; Spitfire FB.5B, FB.5C, FB.9), **TD** (Spitfire FB.5B, FB.5C), **5J** (Spitfire FB.9B, LF.9C).
129	**DV** (Spitfire F.2A, F.14).
130	**PJ** (Spitfire F.5B), **AP** (Spitfire F.5B). Delete Hurricane.
132	**FF** (Spitfire F.2B, F.9B). Delete Spitfire F.2A.
138	**NF** (Halifax B.2.Srs.1, B.2.Srs.2, B.5.Srs.1, B.5.Srs.2; Wellington; Oxford T.2; Liberator).
139	**XD** (Oxford T.2; Mosquito B.25). Unknown (Hudson GR.3).
141	**TW** (Blenheim NF.1F; Beaufighter NF.1F). Delete Mosquito NF.13, NF.19.
146	Unknown (Thunderbolt F.1).
151	**DZ** (Mosquito NF.2, NF.12, FB.6). Delete Hurricane F.2A, Mosquito NF.13.
153	Unknown (Beaufighter NF; Mosquito).
158	Unknown (Wellington).
161	**MA** (Havoc; Halifax B.2.Srs.1, B.2.Srs.1A, B.5.Srs.1, B.5.Srs.1A). Delete Halifax GT.5.
163	Unknown (Hudson C.6). Delete Hudson C.3.
164	Nil (Spitfire F.5B), **FJ** (Spitfire F.5B). Delete Spitfire F.5.
168	Nil (Tomahawk F.2; Mustang F.1, FR.1A), **QC** (Typhoon F.1B). Delete Mustang FR.1.
169	Nil (Mustang FR.1A).
170	Nil (Mustang FR.1A).
171	Unknown (Tomahawk F.1).
185	**GL** (Hampden B.1; Hurricane F.1, F.2B, F.2C; Spitfire F.5B, F.5C, F.9, FB.9E). Delete code YN.
186	**AP** (Hurricane F.2; Typhoon F.1B; Spitfire F.5B). Delete Spitfire FR.14, LF.16E.
188	Squadron not formed.
190	**G5** (Halifax A.3, A.7), **L9** (Halifax A.3, A.7). Delete Halifax GT.3, GT.6.
192	**DT** (Wellington B.10).
194	Nil (Hudson C.6; Dakota C.3, C.4).
195	**JE** (Lancaster B.1, B.3).
206	Delete Blenheim.
211	Nil (Beaufighter TF.10).
212	Unknown (Spitfire HF).
216	**LD** (Hudson C.3A). Delete Hudson C.3.
218	**HA** (Stirling B.3).
221	Nil (Wellington GR.8).
229	Nil (Spitfire F.5B, F.5C, F.9), **9R** (Spitfire F.14).
230	Nil (Sunderland GR.1, GR.2, GR.3, GR.5; Do22).

(*To be continued*)

British Civil Register News

NEW REGISTRATIONS

G-AOFH	D.H.82A Tiger Moth (7043M)—Don Everall (Aviation) Ltd.
G-AOFJ	Auster 5 (3401)—W. S. Shackleton Ltd.
G-AOIM	D.H.82A Tiger Moth (T.7019)—W. S. Shackleton Ltd.
G-AORV	D.H.C1 Chipmunk 22 (C1/0177)—P. de V. Stevens
G-AOSF	D.H.C1 Chipmunk 22 (C1/0023)—A. J. Whittemore (Aeradio) Ltd.
G-AOSY	D.H.C1 Chipmunk 22 (C1/0037) R.—Derby Aviation Ltd.
G-AOTP	D.H.C1 Chipmunk 22 (C1/0034)—Airways Aero Assoc. Ltd.
G-AOTX	D.H.C1 Chipmunk 22 (C1/0005)—Airways Aero Assoc. Ltd.
G-AOTY	D.H.C1 Chipmunk 22 (C1/0522)—Airways Aero Assoc. Ltd.
G-AOTZ	D.H.C1 Chipmunk 22 (C1/0475)—Airways Aero Assoc. Ltd.
G-AOUW	D.H.82A Tiger Moth (N.9255)—Rollason Aircraft & Engines Ltd.
G-AOUX	D.H.82A Tiger Moth (N.6652)—Rollason Aircraft & Engines Ltd.
G-AOUY	D.H.82A Tiger Moth (N.6459)—Rollason Aircraft & Engines Ltd.
G-AOXG	D.H.82A Tiger Moth (T.7291)—Hants & Sussex Aviation Ltd.
G-AOXI	Douglas Dart Dakota (43-48352)—Rolls-Royce Ltd.
G-AOXJ	D.H.82A Tiger Moth (T.6051)—Continental Aircraft Services
G-AOXK	Douglas D.C.4 Skymaster (42931) (Previously OY-DFI)—Air Charter Ltd.

RESTORED TO REGISTER

G-AEZF	Short S.16 Scion (PA.1008)—M. J. Conry
G-AHEY	Avro 685 York C.1 (1302) R. (Previously JY-ABZ)—Skyways Ltd.
G-ANEB	D.H.82A Tiger Moth (N.9209)—Rollason Aircraft & Engines Ltd.

CANCELLATIONS

(*Abbreviation: SA—sold abroad*)

G-AESR	D.H.89A Rapide (6363) R. (Withdrawn from use)—Air Kruise (Kent) Ltd.
G-AGLR	D.H.89A Rapide (6781) R. (Destroyed by fire)—Don Everall Aviation Ltd.
G-AHHO	Auster 5 J.1 Autocrat (2018) (*SA as* D-EGUT)—A. Halsey
G-ALIM	Miles M.14A Hawk Tr. 3 (N.4557) R. (Damaged beyond repair)—Scottish Aero Club Ltd.
G-AMNU	Auster 5 (TJ.587) (*SA*—W. Germany)—G. H. Waugh
G-ANAJ	Short S.45 Solent 3 (S.1293) (Damaged beyond repair)—Aquila Airways Ltd.
G-ANPM	D.H.82A Tiger Moth (N.9205) (*SA*—W. Germany)—J. F. Morgan
G-ANYH	Vickers Viscount 747 (145) (*SA as* VH-BUT)—Butler Air Transport Ltd.
G-AOCT	Douglas C47 Dakota 3 (42-92955); C. of A. extended for 1 month (SA)—R. F. D. Anstead
G-AOCW	D.H.82A Tiger Moth (T.5429) (*SA*—W. Germany)—B. J. Snook
G-AOGX	Douglas C47 Dakota (43-16311) (*SA as* F-OAYM)—Field Aircraft Services Ltd.
G-AOIL	D.H.82A Tiger Moth (T.7363); Transferred to the Royal Navy—Hants & Sussex Aviation Ltd.
G-AOJN	D.H.C1 Chipmunk 22 (C1/0248) (*SA*—W. Germany)—Airways Aero Assoc. Ltd.
G-AOTS	D.H.C1 Chipmunk 22 (C1/0046) (*SA*—W. Germany)—Airways Aero Assoc. Ltd.
G-AOTW	D.H.C1 Chipmunk 22 (C1/0203) (*SA*—W. Germany)—Airways Aero Assoc. Ltd.
G-AOUA	D.H.104 Dove 6A (04475) (*SA as* N.435T)—The de Havilland Aircraft Co. Ltd.

ALTERATIONS

G-ADMT	D.H.87B Hornet Moth (8093)—Herts & Essex Aero Club (1946) Ltd.
G-ADWT	Miles M2W Hawk Major (215)—J. Donaldson Palmer & Partners
G-AFJB	Wicko G.M.1 (5)—G. E. Eddowes & Partners
G-AFWO	Taylorcraft Plus D. (125)—H. B. Bower
G-AGDM	D.H.89A Rapide (6584) R.—Not known. Temporarily unregistered
G-AHBH	Percival Proctor 5 (Ae37)—Not known. Temporarily unregistered
G-AHEG	Airspeed A.S.65 Consul (1052) R.—Swain Holdings Ltd.
G-AHGU	Airspeed A.S.40 (Oxford 2) (3277) R.—Air Couriers (Transport) Ltd.
G-AHHY	Taylorcraft Plus D (216)—D. Johnson
G-AHZH	D.H.82A Tiger Moth (D.F.154)—Southern Flying Schools
G-AIHF	Percival Proctor 1 (R.7495) R.—F. Royce
G-AIKI	Percival Proctor 1 (P.6179) R.—T. A. Vigors
G-AIPR	Auster 5 J.4 (2084)—Not known. Temporarily unregistered
G-AIYU	Piper J3C-65 Cub (10710)—H. Tempest (Cardiff) Ltd.
G-AJEX	Miles M.65 Gemini 1A (6324) R.—E. F. Thurston
G-AJNE	Airspeed A.S.65 Consul (5139) R.—Airwork Ltd.
G-AJPR	D.H.104 Dove 1 (04029) R.—Gulf Aviation Co. Ltd.
G-AKYR	D.H.82A Tiger Moth (R.5140)—A. J. Soper
G-ALAV	Miles M.38 Messenger 4A (RH.428)—John Sutcliffe & Son (Grimsby) Ltd.
G-ALDM	H.P.81 Hermes 4 (H.P.81/14) R.—African Air Safaris Ltd.
G-ALMA	Piper J3C-65 Cub (12042)—E. E. Chick
G-AMPO	Douglas C.47 Dakota 4 (16438) R.—Starways Ltd.
G-ANFK	D.H.82A Tiger Moth (T.7862)—G. Askham
G-ANON	D.H.82A Tiger Moth (T.7909)—A. J. Penzer & Partners
G-ANRM	D.H.82A Tiger Moth (DF.112)—P. J. Cottle
G-ANWJ	Bristol 170 Mk. 32 (13254) R.—Silver City Airways Ltd.
G-ANZY	D.H.82A Tiger Moth (DE.172)—P. W. G. Jordan
G-AOAR	Percival Proctor 4 (NP.181)—A. J. Whittemore (Aeradio) Ltd.
G-AOBG	Somers-Kendall SK.1 (1)—Miss M. Magulow
G-AOBW	Percival Proctor 4 (NP.339) R.—Not known. Temporarily unregistered
G-AOCW	D.H.82A Tiger Moth (T.5429) (SA—W. Germany)—B. J. Snook
G-AOFI	D.H.106 Dove 2B (04477)—B.O.A.C.
G-AOFP	D.H.82A Tiger Moth (T.7807)—W. D. R. Lamb
G-AOFU	Edgar Percival E.P.9 (20)—Edgar Percival Aircraft Ltd.
G-AOHE	Westland S.55 Series 1 (WA/126) R.—The South Georgia Co. Ltd.
G-AORA	D.H.82A Tiger Moth (BB.750)—Not known. Temporarily unregistered
G-AOTJ	Auster 5 (1760)—Not known. Temporarily unregistered

(Continued on page 435)

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Civil Register

(*Continued from page 433*)

AIRPORT NOTES—INTERESTING VISITORS

Blackbushe

4/10	VK501	Varsity—Royal Jordanian A.F.; acceptance flight (delivered to Jordan 18/10/56)
9/10	N2966	Mallard—M. Boussac
11/10	G-AIYS	Leopard Moth—(A) Croydon
	G-AOTO	Chipmunk—Royal Jordanian A.F.; (A) Croydon; later to be transported to Jordan in Viking VK500
17/10	138531	"SP" "VS-31", S2F-1—U.S. Navy; scanner on top of fuselage and under starboard wing
	136752	"SP" "VS-31", S2F-1—U.S. Navy
23/10	VP-YLX	Dove—(A) Levesdon
29/10	SN-AAI SN-AAD	Dakota Sudan Airways

Croydon

10/10	VP-KFJ	Gemini—C/n. 6478; ex-VP-UAZ
12/10	UB213 to 215	P.56 Provost—delivery flight to Burma
17/10	OO-ALU	Bonanza—believed to be ex-G-AOAM
23/10	HB-UBC	Tiger Moth—converted ex-G-AOUX
24/10	D-EDUG	Chipmunk—ex-G-AOJO, WB665; c/n. C1-0113; Deutsche Lufthansa, Köln
	D-EGIM	Chipmunk—ex-G-AOJR, WB756; c/n. C1-0205; Deutsche Lufthansa, Köln
3/11	G-AKTW	Widgeon—c/n. WA/H/1; chartered by R.A.C.

London

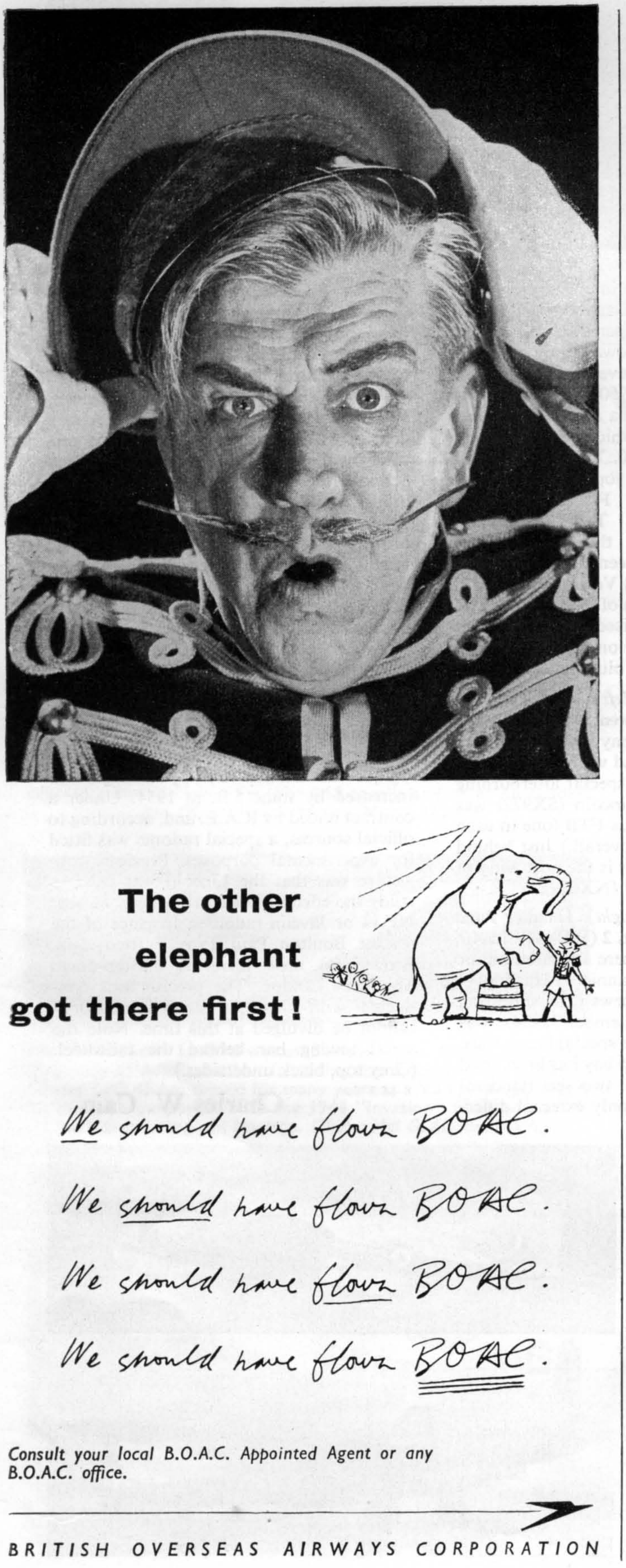
2/10	CCCP-5414	TU-104—Aeroflot
9/10	SP-LCD	Dakota—L.O.T.
16/10	O-51133	C.47—U.S.A.F.; large Stars & Stripes on fin
17/10	N776PA	DC-7B—new colour scheme PAN AMERICAN on fuselage, PAA on top of fin and a globe lower down the fin
26/10	190	Flamant—French Air Force
	8614	C.121A—U.S.A.F.; c/n. 2606
29/10	12693	C.119F—R. Norwegian Air Force BW-B
30/10	XV-NAA	Aero Commander 560A
31/10	N8860	DC-3
	G-AOIA	DC-7C—B.O.A.C.; arrived from U.S.A.
2/11	CCCP-1869 IL-14	Aeroflot—146000840 on fin
	CCCP-1625 IL-14	Aeroflot—146000925 on fin
	CCCP-1605 IL-14	Aeroflot—146000844 on fin

Northolt

4/10	12698 (BW:F)	C-119F—Royal Norwegian Air Force
5/10	43-49360	C-47—U.S.A.F.; "Natural" finish with orange flash on fin and large badge on nose
	No. 192 (C)	MD312—French Air Force
11/10	K14 (OT-CWJ)	C-47—Belgian Air Force
12/10	9700 (GC700)	Freighter 31M—R.C.A.F.; first transport flight
15/10	908	B26C—French Air Force; camouflaged
30/10	CP24 (OT-CBD)	C-119G—Belgian Air Force
	No. 188 (G)	MD312—French Air Force
1/11	12695 (BW:E)	C-119F—Royal Norwegian Air Force
	315613 (BW:K)	C-47—Royal Norwegian Air Force
	KB890 (XV890)	Lancaster 10—R.C.A.F. (left 4/11)

Prestwick

9/10	WZ380 and 391	Vickers Valiants—R.A.F.; for cold-weather tests in Canada (W)
11/10	N1014C	Convair 240—Mohawk Airlines; ex-Swissair (W)
12/10	9302	Boeing WB-50D—U.S.A.F.
13/10	RRAF154	Douglas Dakota—Royal Rhodesian Air Force
18/10	131717 131669	Fairchild R4Q-2 "LH717" Fairchild R4Q-2 "AC669" — U.S. Marines (E)
21/10	54-2182 54-2194 54-2140	North American F-100D Super Sabres—U.S.A.F. (E)
23/10	N4308D	Beechcraft Twin Bonanza D-50—Privately owned (W)
25/10	N1018C	Convair 240—Mohawk Airlines; ex-Swissair HB-IRT (W)
30/10	OY-KNA	Douglas DC-7C—S.A.S. (W)
	FM213	Avro Lancaster 10-ASR—R.C.A.F.; No. 107 Rescue Sqdn. (E)
1/11	OY-KNB	Douglas DC-7C—S.A.S. (W)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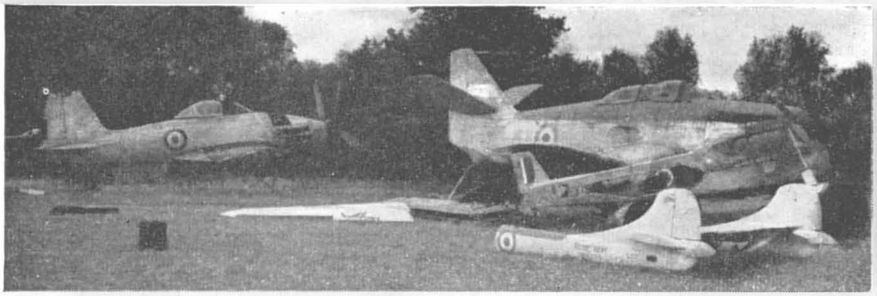


At one time or another most of the R.A.F./F.A.A. prototypes visit the Royal Aircraft Establishment at South Farnborough, Hampshire. Some stay, others go away and return. And since even the best of prototypes sooner or later reach the end of their useful life, some are put out to grass, literally.

One such final resting place is on the north-west side of the aerodrome, not far from Ively Gate. Here, for the period of the non-resident invasion, were shifted a few semi-precious gems including the "penny plain and twopence coloured" Lincolns (SX971 and RF533), the rotund Mamba-powered Apollo (VX224) and the even portlier, panniered Hastings Mk. 2 (WD480). Other flyable specimens included a Valetta (WL679), a Varsity (WL674) and another grey/black Lincoln (WD125).

The "graveyard" proper contains amongst other things the serrated remains of a Douglas Boston III fuselage apparently used to test power-operated rescue saws; a weather-beaten airframe identified as a Bristol Buckmaster (TJ714), and a much-scorched, engineless Blackburn B.47—the second of the Griffon-powered so-called "YA-5s"—the actual designation—S.B.A.C.-devised nomenclature—the YA-8 (WB788).

Photo 1 (*top, right*): Skeletons in the cupboard include (left to right): **Westland W.34 Wyvern TF. Mk. 1 (VR133),** one of the ten production models of the piston-engined Wyvern. The eight-blade Rotol contraprop was driven by a 2,690-h.p. Rolls-Royce Eagle, with twenty-four cylinders arranged in H-fashion. (Silver overall.) **Blackburn B.54 (YA-5)**, the first prototype (WB781) of this two-seater, powered by a Rolls-Royce Griffon engine driving contra-rotating propellers, flew for the first time on 20th September 1949. The second prototype (WB788), also carrying the type number B54, was a three-seater and was designated YA-7. It was an interim test vehicle designed to the Fairey Gannet Naval Specification GR.17/45. Experience was gained with this machine, powered by a Rolls-Royce Griffon, and paved the way to the turboprop-powered (2,950-e.h.p. Armstrong Siddeley Double Mamba A.S. MD.1) three-seater YB-1 (WB797) which flew for the first time on 19th July 1950. Type number was B88. (Dark sea-grey top, duck-egg blue undersides.) **Fieseler Fi 156K Storch (VX154),** foreground. Tattered fuselage only. Mainplanes on the grass. (Time-ravaged brown and green camouflage.) **De Havilland D.H.112 Sea Venom F(AW) Mk. 20 (WK379).** Tail boom of the second prototype showing the revised fin and rudder shape. Port wing panel on the grass. (Dark sea-grey top, duck-egg blue undersides.)

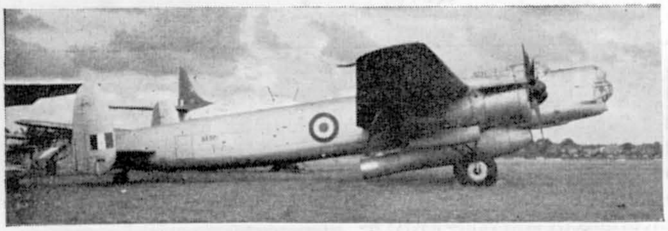
Photo 2 (*below, top left*): **Avro Type 689 Lincoln (Reheat) Derwent FTB (SX971).** Slung from the bomb bay is a Rolls-Royce Derwent turbojet behind which is a long jet pipe terminating in a special afterburning rig. The succeeding Lincoln (SX972) was used as a Bristol Proteus FTB (one in each outer nacelle). (Silver overall.) Just behind the starboard fin/rudder is the port wing of an engineless Lancaster (NX679).

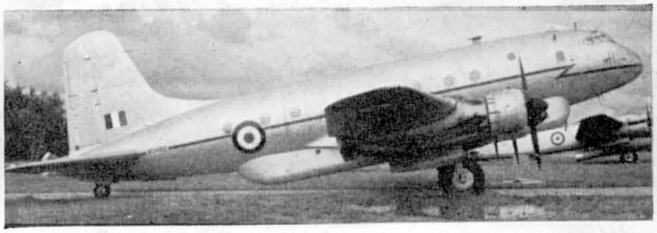
Photo 3 (*below, top right*): **Handley Page H.P.67 Hastings C. Mz. 2 (WD480).** In *Air Pictorial* (June 1954) there appeared an air photo of this unique, panniered Hastings—which according to a news item appearing in *Air Pictorial* (December 1954) was originally "modified for special bomb tests. A long, capacious bomb bay has been fitted under the fuselage with two sets (tandem) of bomb doors." The only external difference of the past two and a half years appears to be the scrapping of the familiar streamlined outline of the dorsal D/F loop for the now standardised and shallower fitting. (Silver overall, blue cheat line.)

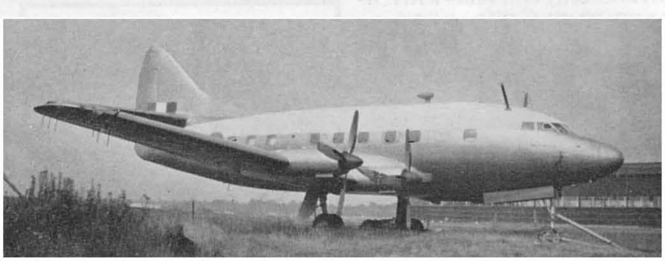
Photo 4 (*below, bottom left*): **Armstrong Whitworth A.W.55 Apollo (VX224).** A resident of R.A.E. for the past two years and used by the E.P.T.S. (Empire Test Pilots' School), the second prototype Apollo was originally G-AMCH—flying for the first time on 12th December 1952. The first prototype of this 26/31-seater (G-AIYN, later VX220) flew for the first time on 10th April 1949. The Apollo, designed to Civil Specification 16/46 and embracing the Brabazon Committee's IIB specification requirements was not further developed, being somewhat overshadowed by the success of the Viscount. (White top, rest silver.)

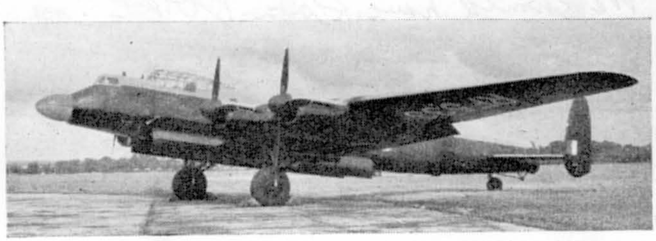
Photo 5 (*below, bottom right*): **Avro Type 694 Lincoln (Radar) FTB (RF533).** Like the pannier-Hastings this radar-nose Lincoln is unique. The normal 78 ft. 3½ in. length was increased by some 5 ft. in 1954. Under a contract issued by R.A.E. and, according to official sources, a special radome was fitted for experimental purposes. Previous conjecture was that the Lincoln was used to study the effects of rain erosion on Meteor NF.14 or Javelin radomes. In place of the former Boulton Paul Type F (two .5-in. Brownings) nose turret is a step-down observer's canopy. The precise tests conducted with this "airborne laboratory" cannot be divulged at this time. Note the aerial towing bar behind the tailwheel. (Grey top, black undersides.)

Charles W. Cain



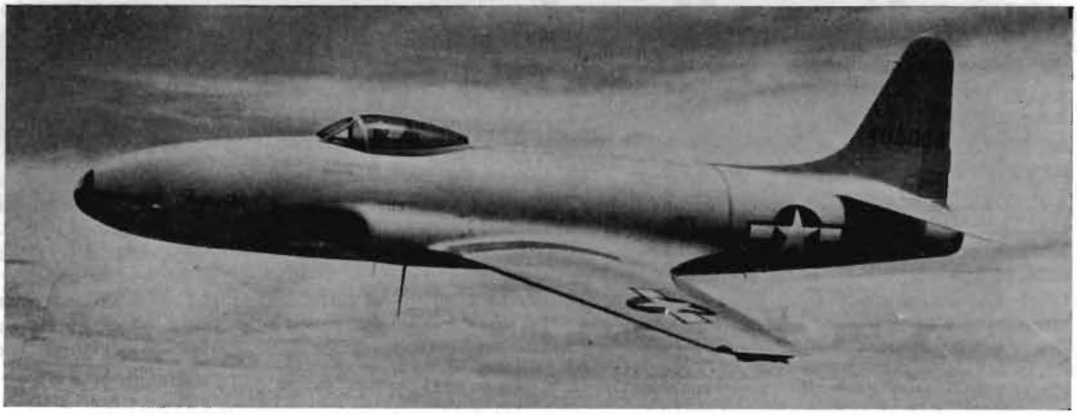




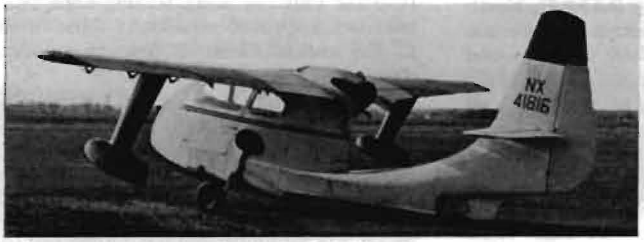


SHOOTING STAR

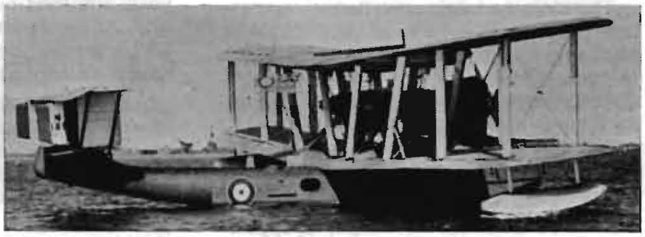
The announcement in late September that the U.S.A.F. had placed its thirteenth successive contract for the T-33A-LO Shooting Star means that by mid-1958 nearly 5,500 T-33As will have been built. This fine *Hal G. Martin* air-to-air study (*right*) shows one of the T-33A (ex-TF-80C) "T-bird's" forebears, a P-80A-1-LO of 1945. Power is 3,850-lb. s.t. J33-GE-9 or '11. Maximum speed 558 m.p.h. for a.u.w. of 14,000 lb.



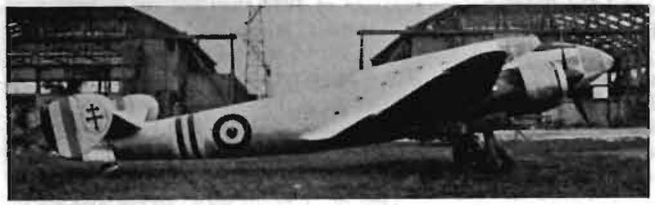
PHOTOS BY REQUEST



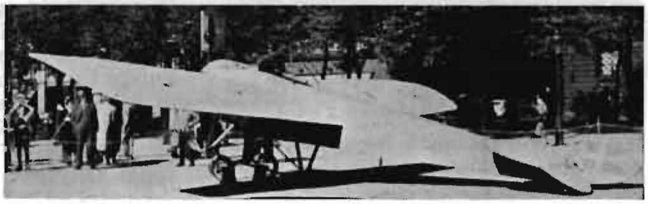
THUNDERBOLT AMPHIBIAN was the name given to the Seabee prototypes (4). Between 1945 and 1947 1,060 RC-3 Seabees were built. A hitherto unpublished photo of NX41816 show marked variations from later production model: e.g. non-strut braced and tapered wing; shallower Franklin 6A8 nacelle and taller fin/rudder, etc. (*Photo: Hal G. Martin, Miami, U.S.A.*)



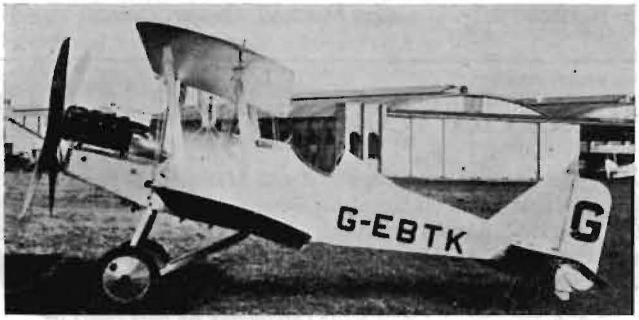
BIRD OF PASSAGE to India in 1928 was this five-seat, medium-range Marine Reconnaissance (Specification R.14/24) Blackburn Iris Mk. II (N185). Powered by three 650-h.p. Rolls-Royce Condor Srs. III liquid-cooled Vee engines, the Iris Mk. II possessed a maximum speed of 118 m.p.h. for an a.u.w. of 27,000 lb. Endurance, from 8¾ hours (normal) to 10 hours (maximum). (*Photo via: R. M. Barnes.*)



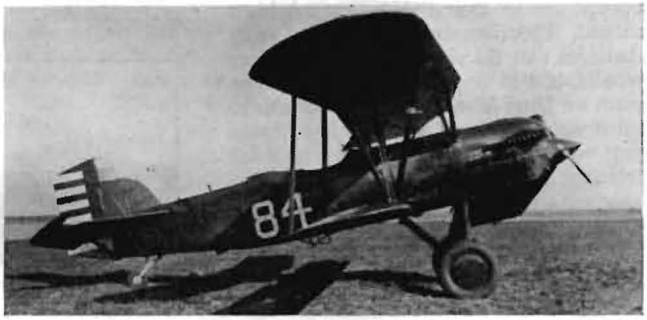
FREE FRENCH LeO 45 was used in the North African campaigns. Originally a l'Armée de l'Air front-line attack bomber, the Lioré-et-Olivier LeO 45 has served for many years as a V.I.P. transport, and for research purposes. Note the 1944 "Invasion" black and white stripes on wing and fuselage. (*Photo: Hal G. Martin, U.S.A.*)



FIRST SWEDISH-BUILT military aeroplane was this French-designed Nieuport VI single-seat "scout" which served in 1914. The Nieuport VI was photographed during an exhibition in Stockholm in the summer of 1951. Span 40 ft. 6 in.; length 27 ft. 1 in.; wing area 250 sq. ft. Weight, empty 880 lb. with 50-h.p. Gnome.



MANY S.E.5As appeared on the British civil register in the 1920s. The famous comedian Will Hay owned one—G-EBTO (Airdisco) which like G-EBTK had a four-blade airscrew. Normal power was a 200-h.p. Wolsey Viper. The smaller frontal area of the 90/120-h.p. Airdisco offset the lower power conversion at Brooklands, 1927.



CURTISS FALCON of the U.S. Army Air Service (later Air Corps) started the O-series of observation two-seaters in 1924. Together with the Douglas O-2 (A to J), the O-1 (A to G) replaced obsolete D.H.4Bs. Illustrated is an O-1E, thirty-seven of which were built in 1929. (*Photo: Hal G. Martin, Miami, U.S.A.*)

Canadian Letter

DURING a trip to Toronto I visited the Canadian International Air Show on 8th September and thought readers may be interested in some of the aircraft taking part.

R.C.A.F. Canadair T-33 Silver Star aircraft from the Flying Instructors' School at Trenton which took part in the show were decorated with a new fluorescent orange finish on nosetip, tail, wing trailing edges and tip-tanks. The R.C.A.F. announcer on the public address system stated that the motif is now standard for Training Command T-33s.

Although it was programmed, the de Havilland CS2F Tracker did not appear on the first day of the show. All CF-100s taking part were Mk. 4s, although at the time Mk. 5s were already in squadron service.

The most nostalgic contribution was the last public appearance of the R.C.A.F. Mustang, making a sprightly low-level pass in close formation with a Sabre and a CF-100, while the best civilian item was the de Havilland Canada demonstration of Beaver Seaplane CF-JBM, Beaver Amphibian CF-GQI, and Otter Amphibian CF-HXY-X. The last-named aircraft was a prototype making its first public appearance. All three aircraft made an amazing simultaneous landing and take-off in tandem within the extremities of the crowd enclosure along the Lake Ontario waterfront at the Canadian National Exhibition grounds where the show is held.

A polished aerobatics display was given by the French Fouga CM 170 Magister, F-BHOH, during which it stayed inverted for 25 seconds in one pass. It was to be demonstrated to the R.C.A.F. at Trenton and Ottawa during the following week.

The Royal Canadian Navy was represented by a formation of its new F2H-3 Banshees, preceded by one of these aircraft on the initial fly-past towing a triangular banner target modified to carry the word NAVY.

Star attraction of this year's show was the U.S. Navy's Blue Angels aerobatic team. During rehearsals the day before the show opened one of their F9F-8 Cougars hit a seagull. The nose section was so badly damaged that the aircraft, after temporary repairs, had to be flown to the Grumman plant on Long Island near New York to be fitted with a new one. Back in time to take part on opening day its natural metal finish from the cockpit forward contrasted noticeably with its blue-painted fellows. It also differed from the others in that a flight-refuelling probe was fitted.

Accompanying this talented team in its travels are a Lockheed TV-2, flown by the officer who acts as their public address announcer and used "to indoctrinate news media in the principles of jet flying", and a Douglas R5D carrying supporting ground personnel.

The R.C.N. Banshee (126313) which towed the banner in the show was equipped with target-towing attachments and was the only one of the eight aircraft of its type present fitted with special wingtip fairings containing external stores fittings. (See page 417 for photograph showing Banshee with similar fittings.)

All the aircraft were parked near the Toronto Flying Club hangar which contained, among commoner craft, a Luscombe T8F Observer, CF-GGY.

During September I photographed an unusual bird at Cartierville Airport: an R.C.N. Avenger (*85928) fitted with M.A.D. gear on a tail-boom extension.

The fuselage mock-up of the Canadair CL-28 Maritime Britannia was temporarily moved outdoors on 20th October, absolutely dwarfing a nearby R.C.A.F. North Star. At a considerable distance it appeared to be similar to published drawings and model photographs.

Although events in the Middle East have caused the Canadian Government to hold up the Israeli Sabre 6 order with Canadair, I saw one of these aircraft for the first time this morning at Cartierville Airport. Finished in what appeared to be standard R.C.A.F. Air Division grey-and-green camouflage, it carried a large dark blue Star of David on a white disc with large serial numbers (6033) painted in bright red aft of this insignia.

Among the aircraft observed at Dorval Airport recently were the following: the first Canadian-registered Colonial C-1 Skimmer Amphibian, CF-IZS. French Air Force Douglas RB-26 Invader being delivered to Europe by Fleetways Inc.; glossy-black all over, it carried the serial number 664-C on the fin. Hastings C.2 (WD481) of No. 511 Squadron, R.A.F. Transport Command, coded GAP, was parked among North Stars of No. 426 Transport Squadron of the R.C.A.F. on 13th October. This aircraft had observation windows under the nose.

Harold G. Martin's article in the July 1956 *Air Pictorial* on the Smith CW-20T modification of the Curtis C-46 Commando included an illustration of one of these aircraft, N1381N. It is now in Northeast Airlines livery, having been leased by them for use on the Boston-Burlington-Montreal service.

The first Sabre 5 aircraft have been handed over to the two Montreal R.C.A.F. Auxiliary Squadrons, Nos. 401 and 438. In a ceremony at R.C.A.F. Station St. Hubert each squadron received three aircraft which had recently been returned from Europe by No. 1 Overseas Ferry Unit. Each Auxiliary Fighter Squadron will eventually be equipped with eight Sabre 5s, four T-33s and two Harvards. The Auxiliary Sabres still carried Air Division camouflage and markings. These markings, replacing the usual fin cockade with a Canadian ensign and adding the words ROYAL CANADIAN AIR FORCE to the fuselage sides aft of the roundel, have only been used in Europe.

While on the subject of Sabres, I would draw your attention to the caption for my photograph of the Sabre 6 which was printed in your October "Letters" section. It states that the wing leading-edge slats are fixed. Improved versions of those fitted to the earlier Sabre 2 are, of course, movable.

Both St. Hubert-based CF-100 squadrons, Nos. 423 and 425, have received a number of the Mk. 5 version of this aircraft. None of these have the camera ports or rear fuselage flush-mounted air brake mentioned by a Canadian correspondent in your October letters. CF-100 Mk. 3CT trainer conversions are also attached to the squadrons at St. Hubert.

Screening some motion picture films taken by my father in the 1930s we have made an interesting discovery. When No. 1 Fighter Squadron visited Canada in the summer of 1934 they put on a display at St. Hubert Airport. Accompanying the R.A.F. Furies was a Ford Trimotor wearing R.A.F.-type roundels and the letters WZ on the sides of the rear fuselage and wing undersurfaces. The Ford script signature usually carried on the vertical fin of civil Trimotors was retained.

One of "Chronicler's" recent articles on U.S. aircraft in pre-war R.A.F. service does not mention this type. Could it have been chartered for the tour or did it belong to the R.C.A.F.? I would be most interested in any information that you or your readers might have concerning this aircraft.—**G. A. Fuller, Montreal, Quebec, Canada.**

Civil Service Commission

(1) Naval Cadetships. (2) First Appointments in the Royal Marines. (3) Entry to the Royal Military Academy, Sandhurst. (4) Royal Air Force Cadetships. Examinations begin on 19th February 1957. Age on 1st March 1957 for (1) and (2), at least 17 years 2 months and under 18½ years; (3), at least 17½ years and under 18½ years; (4), at least 17 years and under 19 years.

For further particulars and application forms write (*preferably by post card*) to: Secretary, Civil Service Commission, Burlington Gardens, London, W.1, quoting No. 1001/57/83. Completed application forms should be returned by 20th December 1956.

A/*Z*1658/150/10/56/*MF*

Letters to the Editor

HANDS ACROSS THE SEA

IF anyone still doubts the power of *Air Pictorial*'s "Letters" columns, I shall be happy to enlighten them. As a result of the publication of my letter (page 218, June, "Polish RWD Types") I have received a number of interesting letters from other readers answering my plea for the loan of original, pre-war material concerning Polish aviation development.

One of the most fascinating letters came all the way from Florida, from no less a person than *Air Pictorial*'s veteran aviation photographer and archivist, Mr. Harold G. Martin.

I cannot resist sharing with other readers one of the rarer items I have received—the accompanying photo of the Polish PWS-54.

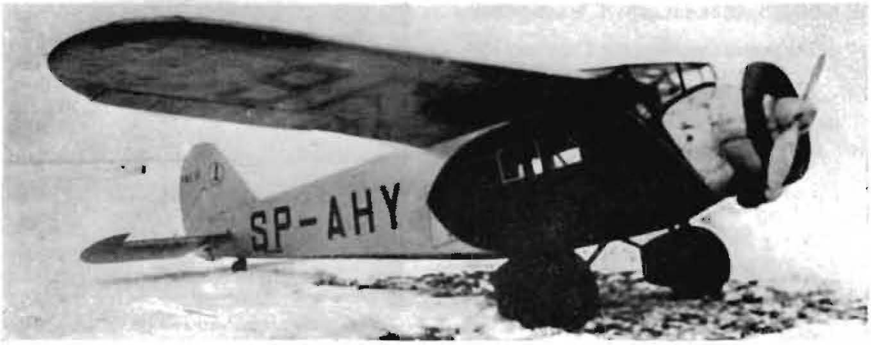
The high-wing PWS-54 prototype was test-flown 1932/33 powered by a 225-h.p. licence-built (Skoda) Wright J-5 radial. However, subsequent tests conducted by Polish Airlines P.L.L. LOT indicated that this five-seat feederliner would be better served by having a more powerful radial—so in the production contract for seven PWS-54s, the 420-h.p. P. & W. Wasp Junior was substituted.

The designer, Mr. Z. Ciolkosz (until recently on the engineering staff of the former—now Vertol—Piasecki Helicopter Corpn.) developed the PWS-54 from the PWS-24 and the earlier PWS-20 of 1927–29. Sometimes called the Type T (for Transport), the PWS-54 was of mixed wood and metal construction with a fixed and spatted oleo-pneumatic main undercarriage. Mr. Ciolkosz insisted on extremely elaborate wind-tunnel tests with the result that the PWS-54—with a maximum cruising speed of 146 m.p.h. and maximum speed of 155.34 m.p.h.—was undoubtedly one of the world's fastest feederliners of the early 1930s.

The PWS-54 was designed and built at the Podlasian Aircraft Manufacturing Co., at Biala Podlaska, some eighty miles east of Warsaw. PWS (Podlaska Wytwornia Samolotow) now incorporated into IL (Institut Lotnictwa) was one of the oldest Polish aircraft establishments, having been founded in 1923. PWS was responsible for no fewer than fifty-eight different designs of which thirty-one became actual prototype and production types.

The PWS-54 served with P.L.L. LOT on internal routes during the 1930s, and was later used for arial photography and P.L.L. LOT "trail blazing" for its southern European routes, which extended over the Mediterranean to Tel-Aviv-Jaffa (Lydda Airport—now Lod Airport) and Beirut in the Lebanon.

Incidentally, Polish Airlines operated one of the longest mid-European routes in the late 1930s. One could travel from as far north as Helsinki, via Tallinn (Estonia), Riga (Latvia), Wilno, Warsaw and Lwow (Poland) to Tel-Aviv; by way of Cernauti (Czernowitz) and Bucharest (Rumania), Sofia (Bulgaria), Salonika and Athens (Greece) and finally to the island of Rhodes and on, over Cyprus to Palestine.


Prototype Polish PWS-54 (SP-AHY) on the snow-covered aerodrome during the winter 1932/33. Note ringed insigne of P.L.L. LOT on the fin. (*Photo via Hal G. Martin, Miami, U.S.A.*)

May I take this opportunity of thanking publicly all the readers of *Air Pictorial*—and of course Mr. Harold Martin!—for their unstinted co-operation.—**J. S. Orwovski, 6 Harrington Villas, Preston Park, Brighton 6, Sussex.**

(*Additional details supplied by Mr. Harold G. Martin include; Span* 40 *ft.* 4½ *in.; length* 29 *ft.* 10½ *in.; height* 8 *ft.* 9¼ *in.; wing area* 226 *sq. ft.; aspect ratio* 7.2. *Weights, empty* 1,984 *lb.; loaded* 3,395 *lb.; payload* 794 *lb. Service ceiling* 13,780 *ft.; climb to* 9,840 *ft. in* 4 *min.* 10 *sec.*—ED.)

NOTICE TO CORRESPONDENTS

Readers are again reminded that letters to which a reply is expected by post MUST be accompanied by a stamped addressed envelope. Many readers are ignoring this requirement and the Editor regrets that it is not possible to answer the large number of their letters.

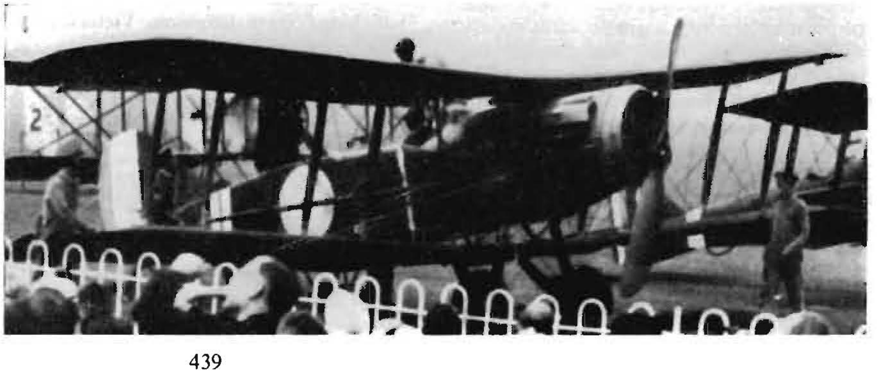
Readers are requested to confine their requests to reasonable dimensions. It is not possible to give information about long lists of aircraft.

ANY OFFERS?

THE enclosed photograph (see below) was obtained in 1952 while stationed in England, and shows a modified Bristol F2b on exhibition along with the Royal Aeronautical Society's Caudron G-311 and an unidentified S.E.5a. The donor of this photograph could only guess that it was taken before World War II at Hendon or Farnborough.

Could any reader throw some light on the Bristol and S.E.5a shown in this photograph? To my knowledge there are only two Bristols and three S.E.5a's in existence today in England, and it would be wonderful if some reader could tell us if the machines in the photograph are still in one piece and in safe storage.—**Major K. S. Brown, U.S.A.F., Florida, U.S.A.**

Readers are invited to forward information about this Bristol F.2b, mentioned by Major K. S. Brown in his letter above.



DIZZY NINE

QUITE a few conflicting reports about the four-jet Douglas DC-9 have been published, with the quite logical result that I am baffled!

In order to settle an argument with some "hangar flying" types I would like *Air Pictorial* to act as the oracle!—**John Hancock, Birmingham.**

(*To get a clearer picture of the controversial DC-9, we approached Mr. Don Black, the Assistant Director of Public Relations, at Douglas, Santa Monica, California. He says:*

"Over a period of months there has been a considerable amount of speculation in trade publications concerning a forthcoming Douglas DC-9 jet transport. To date, however, the Company has issued no release or statement on such an airplane.

(*Continued overleaf*)

LETTERS *(Continued)*

"At the present moment the Company continues to evaluate the market for a lighter, shorter-range jet transport. We have asked all the world's leading airlines to indicate their interest and what their requirements might be in such a model.

"Up to the present time, no decision has been reached."

According to some American publications the DC-9 is planned as a 600-m.p.h. cruise, medium-range pure jet transport, with an all-up weight of about 110,000 *lb. Mention has been made of the utilisation of the "two-spool"* 7,500-*lb. s.t. Pratt & Whitney J52-P turbojets—a development-contract jet for the U.S. Navy.*—Ed.)

REQUEST GRANTED

THIS year I was fortunate enough to be able to visit the S.B.A.C. Flying Display and Exhibition at Farnborough. But you do not mention in the October *Air Pictorial* the various interesting experimental aircraft which could be seen across the runways and close to the distant boundary of the airfield.

I saw the Apollo, a Hastings and two Lincolns. It would be highly appreciated if you could illustrate some of these aeroplanes.—**P. J. Borms, Sumatrastraat 23, Beverwijk, Netherlands.**

(*In response to the large number of requests from readers, we publish on page 436 a selection of photographs of the aircraft in the Farnborough graveyard.*—Ed.)

THE TARRANT TABOR

FORTY years ago this month, I became a test pilot at Farnborough, succeeding Sergeant-Major Power, killed while flying an early FE-2. Two months later, I handed over to Sergeant Dunne, who was killed taking-off in the Tarrant Tabor on 26th May 1919.

Bruce Robertson says* that the final report on the accident was not conclusive in regard to pilot error; pilots who saw it thought differently.

On 17th April 1919, the Royal Aero Club announced the entries for the Daily Mail Prize of £10,000 for a non-stop flight, in either direction, across the Atlantic. Dunne said, with truth, that he could see nothing in the list half as good as the Tabor, for a flight to be made from England to U.S.A. The £10,000 prize, for the pilot, was constantly in his conversation in the mess.

His orders, I was told, were that he must not open up the top engines; with anxiety and surprise, pilots saw him prepare for take-off with "a great surge of power for the actual take-off run." It was never the intention of the Air Ministry that the Tabor should be flown on that date, as distinct from taxi-ing trials; and Dunne may have been blinded to his orders by his wish to prove that this fine aircraft could win the coveted prize.—**G. W. Williamson, O.B.E., M.C., Belfast.**

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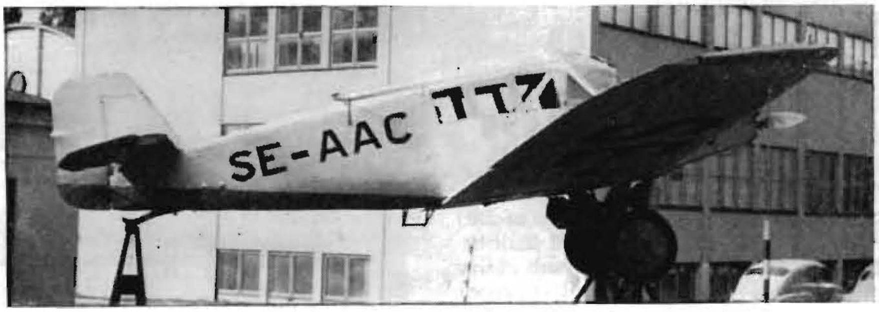
* *The Tarrant Tabor, page 267,* Air Pictorial, *August 1956.*



This well-preserved Junkers F.13 is stored outside the Technical Museum in Stockholm.

MiG-15 DETAILS

AS many readers will know, on 25th September last a Polish Air Force MiG-15 escaped from Poland and landed at Ronne Aerodrome, on the island of Bornholm, in the Baltic.

I was able to inspect this aircraft closely and thought that readers may like to have some details.

It was an early production MiG-15 and the colour scheme was: unpolished aluminium all over (various shades); number 1327 in black letters on both sides of the nose; red and white national insignia of the Polish Air Force on the fuselage sides and tail fin but, curiously enough not on the wings. Another odd point was the absence of an anti-glare panel in front of the cockpit.

I was pleased to see the Ju 86 photograph (*Air Pictorial*, page 309, September 1956) taken at Bromma Airport. I, too, have seen a Ju 86 with the registration SE-BZO. Another interesting Junkers machine is the F.13 which is stored outside the Technical Museum in Stockholm. I am enclosing a photograph (above) for the benefit of readers who may be interested.—**"Fagot", Copenhagen, Denmark.**

KANGAROO CORRECTION

MAY I correct Mr. Coates about the use of the R.A.A.F. Kangaroo insignia which he mentioned in his letter on page 179 of the May issue.

To my knowledge the insignia is confined to the Beaver and Sabre, and all other R.A.A.F. aircraft have normal markings. However, a questionnaire has been sent to all ranks asking if they prefer the present insignia; the insignia as on the Beaver and Sabre, or a roundel with a leaping Kangaroo enclosed. The choice of the majority will be adopted as the official markings.—**R. A. Wakeham, North Brighton, Victoria, Australia.**

(*An illustration of the new Royal Australian Air Force insignia appeared on page* 383 *of the November issue.*—Ed.)

THE REAL THING!

EALING Studios are making a film starring Jack Hawkins about a civilian test pilot, and a Bristol 170 Mk. 21, G-AIFV, owned by Silver City Airways, was being used for a landing sequence in which the machine was supposed to land on one wheel with a dead engine.

This manœuvre had, apparently, been practised at Ferryfield, but on 16th May at Wolverhampton aerodrome the 170 came in fast, ran out of runway and ended up in a dyke. The damage is extensive, mainly wings and front fuselage.

I had always thought, when seeing one of these "Air Epics" at the local cinema, that these film sequences were faked, but this incident convinced me that some are the real thing.—**D. H. Cotterell, Lower Earley, Berks.**

HANDLEY PAGE GENEALOGY

FOLLOWING the recent correspondence and details published in *Air Pictorial* with regard to the Handley Page 42 airliners (see pages 280–81, August 1956 issue), it is of interest to trace the direct link between the huge Handley Page biplane bombers of the Great War and the Halifax.

In 1915, Handley Page produced the H.P.11 or 0/100 which was powered by two Rolls-Royce Eagles and had an all-up weight of 14,000 lb. The development of this was the 0/400 or H.P.12 which first flew in 1917. This type formed the heavy bomber squadrons of the Independent Air Force and was responsible for the intense bombing of Rhineland towns. In 1916 it was a portent of things to come when the 0/700 created a world record by carrying twenty passengers and pilot. The 0/700 was the civil version of the 0/400.

With the armistice came the birth of air line travel. The 0/700 inaugurated the Brussels air service on 20th July 1919 and one month later, on 25th August, began the first scheduled air service to Paris carrying ten passengers and an unspecified quantity of freight. By 1923, the 0/700 had initiated air travel between England and Switzerland.

Even before the end of the war, the H.P.15 or V/1500 night bomber had been evolved from the 0/400. With a range of 1,200 miles, it was a formidable weapon of war, but only three had been completed when peace was declared. Subsequently, a new world record was established when the V/1500 carried forty passengers into the air. It was powered by four 360-h.p. Eagles. Each of its four main landing wheels was 5 ft. in diameter, thus enabling it to use rough landing strips.

Handley Page now designed expressly for peaceful needs and produced the H.P.18

W.8 and W.8b commercial biplanes powered by two Napier Lions of 450 h.p. This was later developed into the H.P.26 Hamilton. (See my letter to you dated 11th November 1955, which was not published.) The H.P.27 W.9 Hampstead, an enlarged variant of the three-engined Hamilton, was powered by three 450-h.p. Jaguars. Only one was built. From these, another large biplane was evolved—the H.P.30 W.10 of which four were built and supplied to Imperial Airways in 1926.

In October 1926 a monoplane designated the H.P.32 was built. Named the Hamlet, it had three 120-h.p. Lucifers. Its commercial load was only 800 lb. Only one was built, which bore the registration G-EBNS. This flew with a variety of power units (see caption on picture).

In 1929, Imperial Airways requested a new type of airliner embodying range, serviceability and passenger comfort. They also expressed that the crew should be totally enclosed in a cabin which would not leak each time the machine flew through rain. The H.P.42 fulfilled all these requirements and more when it went into service in 1931.

From it, Handley Page developed the H.P.43 which was capable of carrying thirty fully armed troops. With only three engines (Bristol Pegasus) it had a modified tail unit and slightly altered fuselage. Span was reduced to 114 ft. (top plane). Length was 78 ft. 4 in. and height 23 ft. 10 in. Maximum speed was 118 m.p.h. at 10,000 ft. and the all-up weight was 22,500 lb. The prototype, completed in July 1932, bore the serial number J.4833.

This machine was modified in 1935 to the H.P.51 monoplane by the redesign of undercarriage and tail unit and the fitting of a high, cantilever wing with flaps. Power was supplied by two 700-h.p. Tiger IVs. Span was now 90 ft. and height 15 ft. All-up weight was 18,000 lb. This machine, the only one built, retained the serial number of its predecessor—J.4833. The H.P.52 Hereford bomber was the result of this development work and was put into production.

The next step was the H.P.54 Harrow bomber. This was not the first Handley Page machine to carry this name. In 1926, a torpedo-carrying monoplane, the H.P.31 Harrow, appeared, two of which were built. The H.P.54 first flew in October 1935 and saw service in the 1939–45 war as an ambulance and troop carrier. This version, unarmed and with gun turrets removed, was known as the "Sparrow".

The Harrow was the first type to go into service in any numbers. This was due to the Royal Air Force expansion scheme. It still retained much of the general appearance of the stately old "42s" which used Croydon regularly in the 'thirties.

The next chapter in the story was the Halifax. It was at this point that the trend of design ceased to show any family resemblance save to perpetuate the Handley Page reputation of building large aeroplanes.—**A. W. J. G. Ord-Hume, Pinner, Middx.**

"OPERATION G.I. SKYHOOK"

PERHAPS I am a trifle naïve but, one comment in William Courtenay's report on the U.S. National Aircraft Show at Will Rogers Field, Oklahoma, Baffles me.

In "America's Farnborough" (*Air Pictorial*, page 361, October) Mr. Courtenay says:

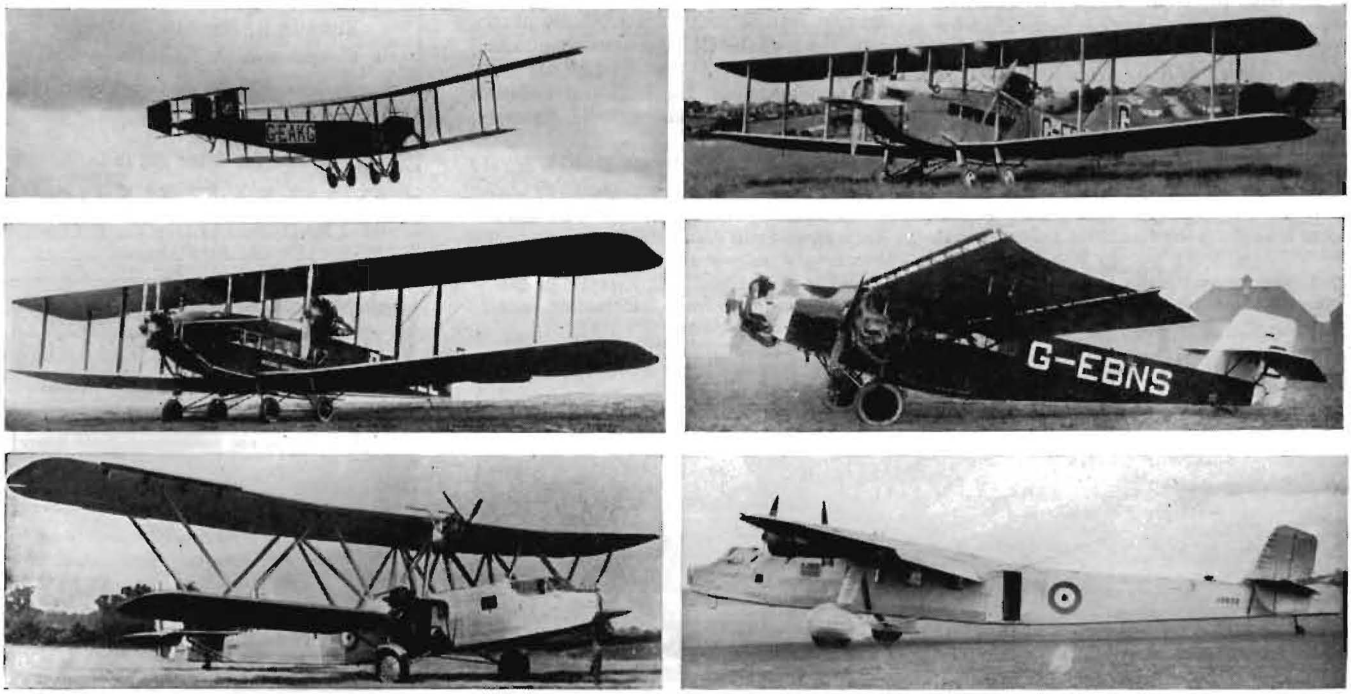
"The De Lackner (DH-4 Heli-Vector) 'one-man helicopter' was on view, but not flying, also a model of the Hiller 'Flying Platform' . . . neither (to date, in tests) have been lifted more than 15 ft. from the ground but as experience is gathered **they will be taken gradually to 5,000 ft. . . . they are only intended for river crossings flying a few hundred feet altitude . . .**" The bold emphasis is my own, since for the life of me I cannot see why these handy "G.I. Skyhooks" should ever leave the safety of 15 ft. plus downwash (ground effect) from the rotor blades. Sounds like the "Gulliver complex" for a "Lilliputian" tactical problem!

For the record, Mr. Courtenay's helicopter flights must have been in the Sikorsky S.58, the twelve-passenger civilian version of the U.S. Army/Marine Corps H-34A/HUS-1, which carry eighteen troops, or the U.S. Navy HSS-1, developed for anti-submarine duties using Sonar gear.—**"Chairborne Spotter", Haywards Heath, Sussex.**

(*U.S. Army Aviation—established in* 1947 *—has twelve each of the De Lackner Heli-Vector and the Hiller "Flying Platform" on order for delivery during* 1956/57. *U.S.A.A. will possess more than* 3,900 *aircraft—*50 *per cent helicopters—before the year is out. Army Aviation is campaigning for wider terms of reference than the current restrictive maximum a.u.w. of* 5,000 *lb. category—heaviest type being the de Havilland U-1A-DH Otter which carries ten troops or* 2,000 *lb. cargo. The Otter—twenty-one units—comprises the 1st Tactical Transport Company, activated on 30th June.*—ED.)

(*Continued overleaf*)

A selection of photographs of Handley Page aircraft mentioned by Mr. Ord-Hume in his letter above. They are: (*top left*) the 0/400 and 0/700 night bomber/civil transport; (*right*) H.P.26 Hamilton; (*middle left*) H.P.27 Hampstead; (*right*) H.P.32 Hamlet; (*bottom left*) H.P.43 bomber/transport; (*right*) H.P.51 bomber/transport. (*Photo: via A. W. J. G. Ord-Hume, Pinner, Middx.*)



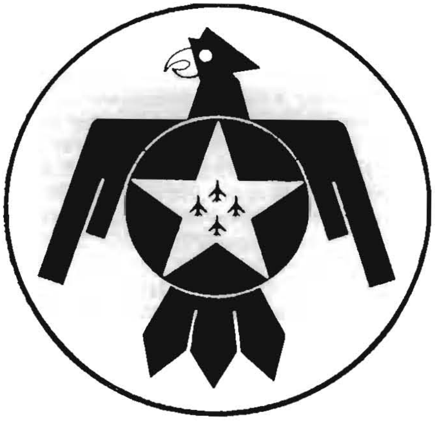
THUNDER-STRIP?

BY the Great Mojave Desert! May your special correspondent Mr. William Courtenay be forgiven for his slip of the pen when referring to F-100s as "Thunderjets" in the Oklahoma City report on the National Air Show.

Before we get another Boston Tea Party a'brewing let's line up the historical facts.

The four-man aerobatic team (plus reserve man) are known correctly as the United States Air Force *Thunderbirds*. This supersonic quintet is led by Major J. M. Broughton. The others are: Captains B. J. Ellis and E. D. Palmgren and 1st Lieutenants R. D. Anderson and W. R. Pogue.

The current steeds are North American F-100 Super Sabres. On the nose of each is painted the *Thunderbirds*' special (F-100) insignia which I hope you will publish as a penance! Yes, the diamond formation represents Super Sabres all right.



"Thunderbirds'" insignia.

Maybe it's some slight consolation to Mr. Courtenay to recall that the previous mounts of the *Thunderbirds* were *Thunderstreaks* (F-84F-41-REs).—**E. P. Johnson, Boston, Mass., U.S.A.**

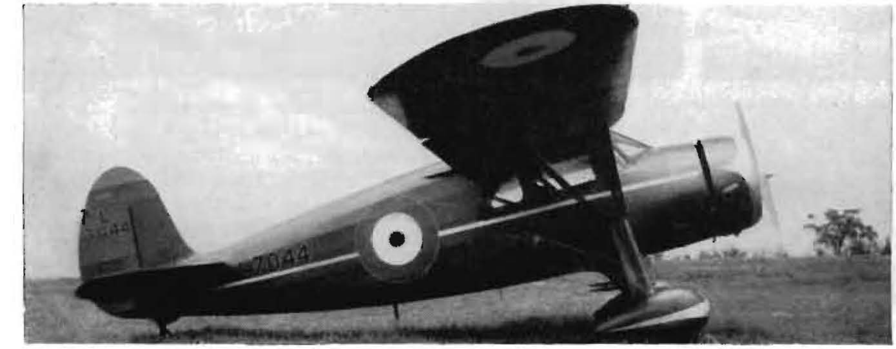
MEMORIES OF L7044

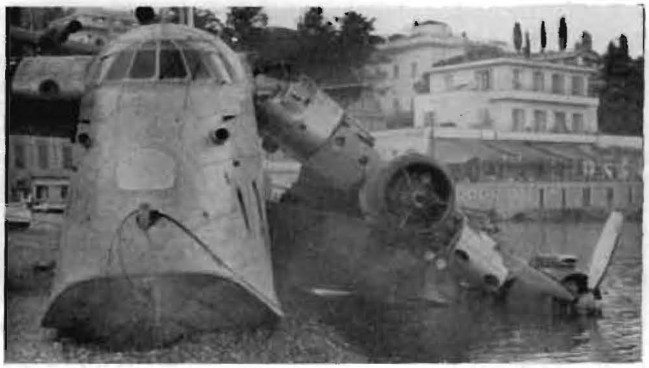
REFERRING to the interesting account of U.S. Aircraft in British Service (*Air Pictorial*, July 1956) I would like to add some details on the Fairchild F.24 (L7044). I was Air Attaché in Washington from September 1935 to October 1937, and on Air Ministry authority the machine was ordered from the Fairchild plant at Hagerstown in February 1937. It was selected from several types with the help of Mr. Jimmy Taylor, the well-known test pilot.

It was fitted with radio-beam reception and for night flying, and was occasionally flown from New York to Washington at night. The authorities at Washington were most helpful, and permitted the aircraft to be parked overnight outside a hangar with the brakes on and cabin locked. The cabin key was then handed to the control tower staff to be collected by the maintenance staff the following morning.

I cannot remember any trouble with the aircraft or engine, and although I never flew in it much farther than Cleveland, I believe my successor flew it right over the Rocky Mountains to the West Coast.—**T. E. B. Howe, C.B.E., A.F.C. (Air Commodore, Ret.), Ringwood, Hants.**

Reference was made to this Fairchild F.24 (L7044) in Part I of "U.S. Aircraft in the British Services" in the July issue. This photograph, along with fresh information, was kindly supplied by Air Commodore T. E. B. Howe.





Mr. Apostolo's interesting letter and *Air Pictorial*'s registrations expert's comments are published below. This photograph shows the extensive damage to G-ANAJ. (*Photo: G. Apostolo, Milan, Italy.*)

LAST DAYS OF G-ANAJ

A SAD sight on the Santa Margherita beach is the Short Solent G-ANAJ which was severely damaged during heavy seas on 26th September last. As my photograph shows (above) the port wing collapsed completely when the flying-boat was beached, although the hull and tail unit received only minor damage.—**G. Apostolo, Milan, Italy.**

(*Registered originally as G-AGWU, the Solent mentioned in Mr. Apostolo's letter was a Seaford with Solent-type nose and tail fairings, and was used by B.O.A.C. as a crew trainer (writes* Air Pictorial*'s registration expert). It was returned to the R.A.F. when twelve Solents were in regular service. It was then bought by Aquila Airways and re-registered G-ANAJ. Converted at Hamble to Solent 3 standard, City of Funcaal, as it was then called, went into service on the Southampton-Genoa route. After being written off all salvable parts were removed and returned to England for spares. Aquilla have since bought another Solent as a replacement.*)

AIR BRITAIN

A BRANCH of Air Britain has been founded in the Isle of Wight and the membership now stands at fourteen. Meetings are held on the last Wednesday of each month and new members are welcomed. All communications should be addressed to **M. E. Richards, Hon. Secretary, Longleat, 47 Surrey Street, Ryde, I.O.W.**

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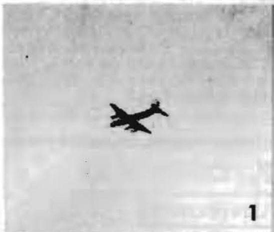
BRITISH INSTITUTE OF ENGINEERING TECHNOLOGY

"Miniature Spotting" *(For Answers see page 444)*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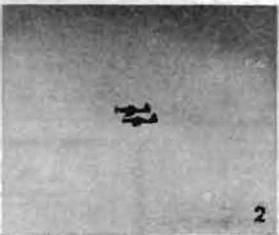
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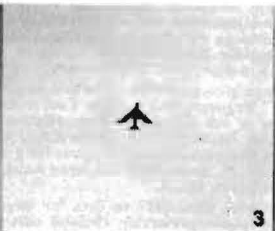
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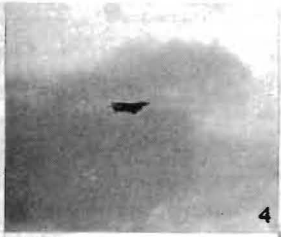
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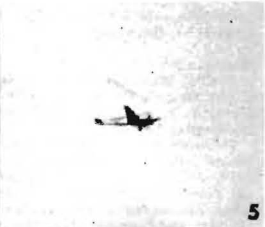
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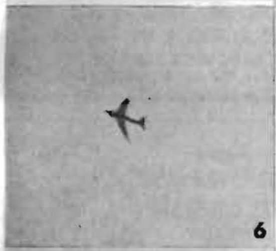
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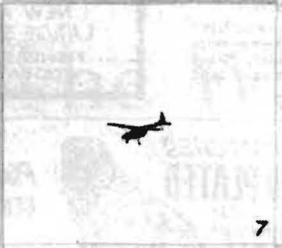
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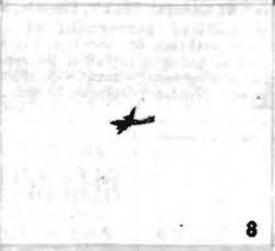
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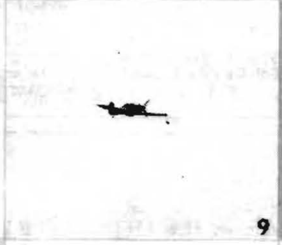
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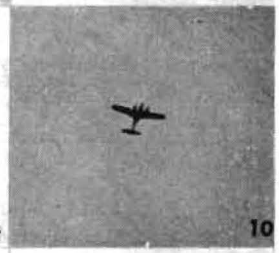
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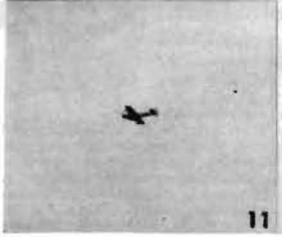
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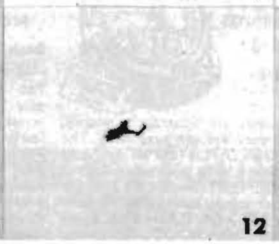
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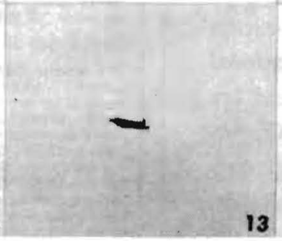
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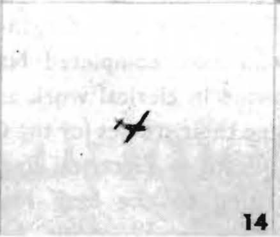
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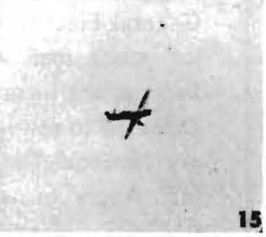
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BRITISH REGISTRATIONS IDENTIFIED

by F. A. Hudson, British civil register specialist of Registration Research

G-EATM	Handley Page O/10 (ex-D4609); Handley Page Ltd.; scrapped at Cricklewood 1921
G-EATN	Handley Page O/10 (ex-J2261); Handley Page Ltd.; scrapped at Cricklewood 1921
G-EATS	Bristol Bullet (c/n. 5869); Bristol Aeroplane Co. Ltd.; cancelled 1925
G-AERD	Not allotted
G-AEZX	Not allotted
G-AGNW	York C.1 (c/n. 1224, ex-TS799); sold as ZS-ATS; restored to B.O.A.C.; sold to Lancashire Aircraft Corp. used trooping serial WW581; sold as EP-ADB 1955 and badly damaged by fire at Stansted 17/9/56
G-AGWW	Sandringham (c/n. SH 5c, ex-EJ156); sold to Compagnie Aeronautica Uruguaya, S.A. as CX-AFA; sank at moorings at Montevideo 11/9/56 and written off
G-AHNK	Tudor 4 (c/n. 1344); "Star Lion" M.C.A.; broken up at Hurn 1953 and remains taken to Southend
G-AHRG	Viscount (c/n. 2); Ministry of Supply; completed as Type 633 Tay test-bed with serial VX217
G-AIRX	Anson I (ex-AX232); Airwork Ltd.; sold as VP-KJK and crashed at Kitale 1/10/56
G-AIVG	Viking 1B (c/n. 220); B.E.A.C. "Sir George Rooke"; burst tyre on take-off and crashed at Le Bourget 12/8/53
G-AJRZ	Argus (c/n. 722, ex-FZ782, 43-14758); B.K.S. Engineering Ltd.; sold to Eire
G-ALEK	Anson I (ex-NK242); sold to Belgian Air Service as OO-SRA; crashed 14/8/49
G-ALLR	Primary Eon 1 (c/n. P/017); Capt. J. L. Purser; registration cancelled
G-ALMO	Primary Eon I (c/n. P/004); Army Gliding Club; registration cancelled
G-AIMY	Olympia Eon I (c/n. 020, ex-BGA532); G. H. Stevenson & Partner; registration cancelled
G-AIMZ	Primary Eon I (c/n. P/008); K. H. C. Goodridge; registration cancelled
G-AOEV	Tiger Moth (c/n. 82765, ex-R4833); W. A. Rollason Ltd.; sold as D-EKUN
G-AOEY	Tiger Moth (c/n. 85899, ex-DF150); Wiltshire School of Flying Ltd.
G-AOJO	Chipmunk 22 (c/n. C1/0113, ex-WB665); Airways Aero Association Ltd.; sold as D-EDUG 1956; returned to U.K. Oct. 1956
G-AOJR	Chipmunk 22 (c/n. C1/0205, ex-WB756); Airways Aero Associations Ltd.; sold as D-EGIM 1956; returned to U.K. Oct. 1956

FOREIGN REGISTRATIONS IDENTIFIED

by F/Lt. D. A. S. McKay, D.F.M., overseas civil register specialist of Air-Britain

AP-ACI	Auster J/5 (c/n. 2871); Karachi Aero Club
AP-AHO	Convair 240 (c/n. 42, ex-VH-TAP); Pakistan International Airlines Corporation
CF-TFM	Canadair 4 (c/n. 137); Trans-Canada Air Lines
CF-AZV	Stinson SR-8CM Reliant (c/n. 9733); Arctic Wings Ltd.; no longer registered
D-ACIG	Convair 340 (c/n. 211); Deutsche Lufthansa A.G.
D-EBAB	Safir (c/n. 91290); Deutsche Lufthansa A.G.
D-EDOR	Tiger Moth (c/n. 86519, ex-G-AOEW, NM211); Flughafengemeinschaft
D-IDAM	Avro XIX (c/n. 1326, ex-SE-BUI, G-AHIK); Bedarfs Luftfahrt J. C. Pracht
EC-AEO	Skymaster (c/n. 18340, ex-43-17140); Iberia
F-BHIV	Tiger Moth (c/n. 85783, ex-G-ANJP, DE898); Aéro-Club Albert Moreau
F-CAIU	Nord 2000 (c/n. 10/95); C.I.C. de L'Ouest
F-PFOR	Adam RA 14 (c/n. 5); Aéro-Club des T.A.I.
HB-COK	Cessna 170B (c/n. 26445); Section Genève de l'Aéro-Club Suisse
HB-OFU	Percival Gull-Six (c/n. D.65); Alfred Habib
HB-ORO	Caudron Luciole (ex-CH-355); registration re-allotted to Piper Cub (c/n. 13133, ex-44-80837); Balair A.G.
HB-OUA	Piper Cub (c/n. 12715, ex-44-80419); Balair A.G.
HB-OXO	Leopard Moth (c/n. 7045, ex-CH-368); Section Genève de l'Aé.C.S.
I-STER	Macchi MB 308 (c/n. 5815); Ministero Difesa, Aeronautica
I-TTEN	Avia LM 7 (c/n. 1); Aero Club di Venezia
I-FULO	Meteor FL 53 (c/n. 1101); Societa Meteor
I-MAGR	Bell 47D1 (c/n. 147); Ministero Agricoltura e Foreste
SE-BUS	Tri Pacer (c/n. 22-478); AB Skandinaviska Hardmetallverktyg
SE-AYI	Argus 2 (c/n. 572, ex-43-14608); Jämtlands Flygskola
TF-IAL	Skymaster (c/n. 10399, ex-LN-HHK, NC90442, 42-72294); Flugfelag Islands
TF-ISE	Skymaster (c/n. 10378, ex-42-72273); Flugfelag Islands
TF-IST	Skymaster (c/n. 10313, ex-PH-TGN, LN-SUM, N58008, 42-72208); Flugfelag Islands
VH-KCE	Autocar (c/n. 3159, ex-G-ANVT); Australian Aircraft Sales
VH-TVI	Viscount 756 (c/n. 147); Trans-Australia Airlines
VP-YLC	Anson I; Hunting Clan African Airways Ltd.

INFORMATION WANTED

Details of the H.P. 88 crescent-winged, research aircraft, and any details of H.P. Victor, serials, modifications, colour schemes, first flight dates, etc.—4170694 L.A.C. McNamara, M.E. Comm., Squadron, H.Q. M.E.A.F. (Main), B.F.P.O. 53, Cyprus.

Registrations of aircraft at London Airport on 16/6/52, also serials of Flamants in Northolt/London Airport on 24th, 27th, 29th, 30th and 31st August, and 3rd, 7th and 8th September.—M. Bewick, 7 Whitehall Lane, Buckhurst Hill, Essex.

Location of the Reservist Training Schools where Chipmunks WB.725 (coded 13) and WB.726 (coded 30 or 38) were in service before being civilianised from R.A.F. M.U. Cosford and Hullavington respectively or of any other place where they are known to have last been in service.—M. J. Croft, 29 Royston Avenue, Southend-on-Sea, Essex.

History of Meir Aerodrome, Stoke-on-Trent, i.e. dates, runway material, aircraft used, wartime use, weather (800 altitude), much snow or fog.—J. J. Coope, 366 Horbury Road, Wakefield, Yorks.

Details of Merlin-engined Lysander—the mark of which is unknown—that flew from Hawkinge during 1942.—592491 L.A.C. Smith, M.G.W., c/o S.S.Q., Royal Air Force, Linton-on-Ouse, York.

Serials and mark nos. of any aircraft at the R.A.F. Henlow "Battle of Britain" Display 1953 and R.A.F. Headley Court 1955.—D. G. Crighton, 14 Henderson Place, Bedmond, Watford, Herts.

Wish to contact visitor to Oklahoma Air Show 1956, who has details of colour schemes of aircraft displayed. Want any photographs of Westland and Sikorsky helicopters, particularly the S.55s flown from H.M.S. *Protector* in the Antarctic. Serials must be visible.—L. Tavender, 18 the Crescent, West Hendford, Yeovil, Somerset.

WANTS, DISPOSALS AND EXCHANGES

Wants

Member of the Bologna Aero Club wishes to correspond with Spotters in England.—Bruno Sermariui, Via S. Chiara 6, Bologna, Italy.

Coloured reproductions of drawings or paintings of old motor cars and aeroplanes, produced between 1900 and 1914.—G. Linnell, Leighton Cottage, 179 Main Road, Wilby, Nr. Wellingborough, Northants.

Aeroplane Spotter Vol. I, No. 2; *Aeroplane Spotter* Vol. VII, No. 157.—K. E. Cave, 141 Walton Drive, High Wycombe, Bucks.

(Continued overleaf

WANTS, DISPOSALS, ETC.

(Continued from previous page)

Photographs of the Spitfire VII and the Halifax prototype.—N. J. Nowarra, Berlin N.W.87, Rostockerstrasse, 51, Germany.

Disposals

Book of Westland Aircraft, *Book of Miles Aircraft*, and Gibbs *Aircraft Recognition Manual*. Offers wanted.—David A. Virgo, 27 Legrace Avenue, Hounslow West, Middlesex.

Hand-written, British Civil Register in three large, bound ledgers: (1) G-AAAA to F22 almost complete; (2) G-AGAA to G-ANZZ complete with many details; (3) New Ledger G-AO to date. Over 140 various-sized photographs, mostly British Civil, but some Military and Foreign. Huet Minor "Fopey" binoculars with case, over £13 when new, only casing soiled, highest offers secure.—J. S. Mines, 6 St. Mary's Road, Frome, Somerset.

133 copies of *The Aeroplane* 1951–54, also *Book of Bristol Aircraft*.—J. A. Smirfitt, 5 Shoreham Road, Leeds 12.

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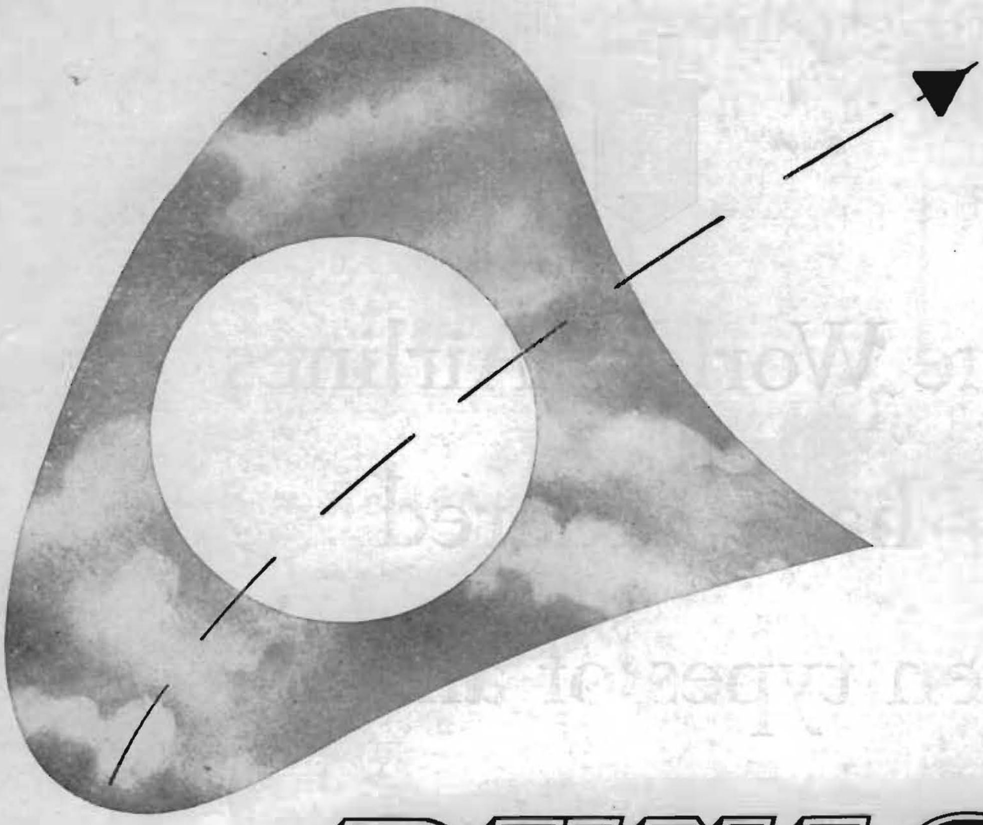

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